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MORE ABOUT

THE

BLACK BASS

BEING A

SUPPLEMENT

TO THE

BOOK OF THE BLACK BASS

BY

JAMES A. HENSHALL, M.D

Fully Illustrated

ROBERT CLARKE & CO
CINCINNATI
1889

Copyright, 1889,

BY

JAMES A. HENSHALL.

TO THE

ANGLING GUILD

OF

AMERICA,

FROM THE URCHIN WITH PIN-HOOK AND WILLOW WAND—THE STILL-FISHER WITH "PEELED SAPLING" AND "CORK"—TO THE ARTISTIC FLY-FISHER WITH ROD AND CREEL.

THIS BOOK IS

FRATERNALLY INSCRIBED

BY

THE AUTHOR.

PREFACE.

THE very flattering reception accorded to the BOOK OF THE BLACK BASS, and the favorable notices and encomiums it has received from naturalists, and anglers, and the press, and its success as a literary enterprise (for all of which I am profoundly grateful), has induced and encouraged me to bring its subject-matter down to date.

For obvious reasons, I have thought it best, beyond the correction of a few clerical and typographical errors, to let the original edition remain intact, and to issue the additional matter in a separate volume in the form of a supplement or sequel—the supplemental chapters agreeing in number and caption with those in the original edition.

The plan pursued in the original book, of illustrating the tools and tackle, by using cuts that have been especially prepared for manufacturers, to illustrate their specialities in that line, has been so much commended by anglers generally, and has proved so desirable a feature, that it has been adhered to in the supplement.

For the new portrait of myself, my publishers are alone responsible. It is an exact reproduction of an excellent photograph.

JAMES A. HENSHALL.

CINCINNATI, DECEMBER, 1888.

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PART I.

TERMINOLOGY, MORPHOLOGY,

AND

PHYSIOLOGY.

SUPPLEMENT

TO THE

BOOK OF THE BLACK BASS.

CHAPTER I.

SCIENTIFIC HISTORY OF THE BLACK BASS.

I MAY be pardoned for referring to the fact that the restoration of Lacépède's names for the Black Bass species, as proposed by me, viz.: *Micropterus dolomieu* for the small-mouthed Bass, and *Micropterus salmoides* for the large-mouthed Bass, has been fully concurred in and adopted by the ichthyologists connected with the Smithsonian Institution at Washington, the Museum of Comparative Zoology at Cambridge, the Indiana University at Bloomington, and of other institutions.

These names are, as Professor Goode says, "grounded upon a firm foundation of priority," and can not now be changed, unless older names should be discovered, which does not seem probable.

In this connection, it is interesting to note that Linnæus had two specimens of the large-mouthed Black Bass sent to him by Dr. Garden, of Charleston, S. C., some thirty years before Bosc sent his drawing and description of the

same species to Lacépède; but Linné failed to describe them.

"Alexander Garden,* one of the earliest American naturalists, was a physician, resident in Charleston, South Carolina, in the middle of the last century. He was an enthusiastic collector, and in constant correspondence with the great Swedish naturalist, many of his letters, with the accompanying notes upon his collections, being preserved in the two volumes of Smith's 'Correspondence of Linnæus.'

"He was more especially a botanist, and his contributions to science in that department are fitly commemorated by the name *Gardenia*, applied by Linnæus, in his honor, to the beautiful Cape Jessamine. He collected, also, reptiles and fishes, and was so careful and conscientious a preparator that almost all of the fishes sent by him to Sweden are still in existence, though the other fishes upon which Linné worked are in a much less satisfactory state of preservation, and most of them, indeed, have gone to destruction.

"Garden's method was to skin half of the fish, leaving the vertical fins attached, to press it in a botanical press, varnish it, and glue it to a sheet of herbarium paper.

"These specimens are preserved in the rooms of the Linnæan Society of London, in Burlington House, in connection with the Linnæan herbarium and library.

"In the summer of 1883, by the courtesy of Dr. William Murie, librarian of the Linnæan Society, we were permitted to make a careful study of the Linnæan fishes, and especially of the American forms, which were, as has been remarked, almost all collected by Garden, and which were named and described by

---

*On the American Fishes in the Linnæan Collection. By G. Brown Goode and Tarleton H. Bean. <Proc. U. S. Nat. Mus., 1885, 193.

Linné, in the tenth and twelfth editions of his *Systema Naturæ*. . . .

"Linné had two examples of the large-mouth Black Bass from Garden (Nos. 8 and 40, Garden), but he does not seem to have described the species.

"For No. 8, see Correspondence with Linné, 311; for 40, see page 306.

"No. 40 is labeled thus by Garden:

No. 40.

LABRUS.

Nostralib.

FRESH-WATER TROUT.

"

Since the publication of the "Book of the Black Bass," I have had the pleasure of personally examining the original type specimens of the Black Bass species in the Museum D'Histoire Naturelle, in the Jardin des Plantes, at Paris.

Lacépède's type specimen of *M. dolomieu*, the small-mouthed Bass (referred to on pp. 12 and 41),* is a fine example, about a foot in length, and is in a remarkably good state of preservation. It is undoubtedly a small-mouthed Bass.

The two specimens sent to the museum by Milbert (pp. 14 and 43), and from one of which the figure in Cuvier and Valenciennes' "Histoire Naturelle des Poissons" was taken, are both large-mouthed Bass, one being fully eight, and the other about six inches in length.

The four specimens from the Wabash river, sent to the

* Book of the Black Bass, 1881.

museum by Le Sueur (pp. 14 and 43), are all small-mouthed Bass, the largest being at least fifteen inches in length, and the others about one-third as long.

I am very glad to have had the opportunity, with Hon. N. Longworth, of Cincinnati (an old Black Bass angler), of verifying Dr. Jordan's identification of these specimens, referred to in his paper on page 41.

CHAPTER II.

NOMENCLATURE AND MORPHOLOGY.

Genus MICROPTERUS Lacépède.

ADDITIONAL SYNONOMY AND REFERENCES.

Grystes Günther, Cat. Fishes Brit. Mus., i, 252, 1859.
Huro Günther, Cat. Fishes Brit. Mus., i, 255, 1859.
Grystes Günther, Intro. Study of Fishes, 392, 1880.
Huro Günther, Intro. Study of Fishes, 393, 1880.
Micropterus Cope, Bull. U. S. Nat. Mus., xvii, 32, 1880.
Micropterus Cope, Rept. Pa. Fish Com., 130, 1881.
Micropterus Jordan and Gilbert, Syn. Fishes N. A., 484, 1882.
Micropterus Jordan, Geol. Surv. Ohio, iv, 942, 1882.
Micropterus Gill, Standard Nat. Hist., iii, 230, 1885.
Micropterus Jordan, Manual Vertebrates, 120, 1888.

Generic Characterizations.

Grystes Günther, 1880.—"Body oblong, covered with scales of moderate size. All the teeth villiform, without canines; teeth on the vomer and palatine bones. One dorsal fin with ten spines; anal with three; caudal fin rounded. Præoperculum with a single smooth margin. One species, from the fresh waters of the United States (*G. salmonoides*), attains to a length of more than two feet. It is known by the name of 'Growler,' and eaten."—(Günther, *Introduction to Study of Fishes*, 393, 1880.)

Huro Günther, 1880.—"Body oblong, compressed, covered with scales of moderate size. All the teeth villiform; bones of

the head without serrature. Mouth rather oblique, with the lower jaw projecting. Two dorsal fins, the first with six spines.

"The 'Black Bass' of Lake Huron (*Huro nigricans.*)"—(GÜNTHER, *Intro. Study of Fishes*, 393, 1880.

MICROPTERUS Cope, 1880.—"I may add here that it seems that the name and characters of the genus *Micropterus* were based on a monstrous or mutilated specimen. The characters thus derived were false and absurd. Under ordinary circumstances, this name should be relegated to the limbo of undeterminable myths. The next name in order is *Calliurus* Raf., which is only applicable to young fishes of this genus, and was almost as badly characterized as *Micropterus*. This name should, however, be adopted, as its characters were drawn from normal objects. As, however, *Micropterus* has obtained some currency, and as the name *Calliurus* is peculiarly false in significance, I retain the former provisionally."—(COPE, *Bull. U. S. Nat. Mus.*, xvii, 32, 1880.)

MICROPTERUS Cope, 1881.—"This genus embraces only two well-marked species, which are found every-where in eastern North America south and west of the Potomac river. They approach the *Labraces* in form, but are most like the extinct genus *Mioplosus*, from the eocene of the Rocky Mountains, in the structure of their fins and other parts."—(COPE, *Fishes of Pa.* <*Rept. Pa. Fish Com.*, 130, 1881.)

MICROPTERUS Jordan, 1882.—"Body elongate-ovate, compressed, the back not much elevated. Head oblong-conic. Mouth very large, oblique, the broad maxillary reaching nearly to or beyond the posterior margin of the eye, its supplemental bone well developed. Lower jaw prominent. Teeth on jaws, vomer and palatines; usually none on the tongue. Preopercle entire; operculum ending in two flat points, without cartilaginous flap. Branchiostegals normally 6. Scales rather small, weakly ctenoid. Lateral line continuous. Dorsal fin divided by a deep notch, the spines low and rather feeble, 10 in number; anal spines 3; the anal fin much smaller than the dorsal; caudal

fin emarginate. Size large. Two species, among the most important of American 'game-fishes.'"—(JORDAN and GILBERT, *Syn. Fishes N. A.* <*Bull. U. S. Nat. Mus.*, xvi, 484, 1882.)

MICROPTERUS Jordan, 1882.—(Same description as the preceding one.)—(JORDAN, *Geol. Surv. Ohio*, iv, 942, 1882.)

MICROPTERUS Gill, 1885.—"This genus is distinguished by the comparatively elongate form of the body, the low dorsal, and especially the slight development of the spines, which decrease to the soft portion, leaving a considerable emargination between the bulk of the spinous and the soft portions. The operculum has a spiniform projection; the mouth is large, and the caudal emarginated."—(GILL, *Standard Nat. Hist.*, iii, 230, 1885.)

MICROPTERUS DOLOMIEU LACÉPÈDE

THE SMALL-MOUTHED BLACK BASS.

ADDITIONAL SYNONOMY AND REFERENCES.

1876—*Micropterus salmoides* NELSON, Bull. Ills. State Lab. Nat. Hist., i, 37.

Micropterus salmoides GOODE, Bull. U. S. Nat. Mus., xiv, 49, 1879.

Micropterus salmoides GOODE, Bull. U. S. Nat. Mus., xviii, 28, 1880.

Micropterus salmoides BEAN, Pro. U. S. Nat. Mus., iii, 96, 1880.

Micropterus salmoides COPE, Rept. Pa. Fish Com., 130, 1881.

1881—*Micropterus dolomieu* MCKAY, Pro. U. S. Nat. Mus, iv, 93.

Micropterus dolomieu JORDAN and GILBERT, Syn. Fishes N. A., 485, 1882.

Micropterus dolomieu JORDAN, Geol. Surv. Ohio, iv, 948, 1882.

Micropterus dolomiei BEAN, Bull. U. S. Nat. Mus., xxvii, 464, 502, 1883.

Micropterus dolomiei JORDAN and SWAIN, Pro. U. S. Nat. Mus., vi, 249, 1883.

Micropterus dolomici BEAN, Pro. U. S. Nat. Mus., vi, 365, 1883.

Micropterus dolomici GOODE, Fish. Industries U. S., sec. i, 401, 1884.

Micropterus dolomiei FORBES, Rept. Ills. Fish Com., 67, 1884.

Micropterus dolomieu GILL, Standard Nat. Hist., iii, 231, 1885.

Micropterus dolomiei JORDAN, Cat. Fishes N. A., 17, 1885.

Micropterus dolomiei VON DEM BORNE, Die Fischzucht, 148, 1885.

Mieropterus dolomiei JORDAN and MEEK, Pro. U. S. Nat. Mus., viii, 7, 1885.

Micropterus dolomiei EIGENMANN and FORDICE, Pro. Ac. Nat. Sci. Phil., 411, 1885.

Micropterus dolomiei JORDAN and GILBERT, Pro. U. S. Nat. Mus., ix, 5, 12, 1886.

Mieropterus dolomieu MATHER, Colvin Adirond. Surv., Fishes, 5, 1886.

Micropterus dolomiei EVERMANN, Bull. Brook. Soc. Nat. Hist., ii, 7, 1886.

Micropterus dolomiei EVERMANN and BOLLMAN, Ann. N. Y. Lyc. Nat. Hist., 339, 1886.

Micropterus dolomieu JORDAN and EVERMANN, Ind. Agric. Rept., 13, 1886.

Micropterus dolomieu VON DEM BORNE, Schwarzbarsch, etc., 3, 1886.

Micropterus dolomiei GOODE, American Fishes, 54, 1888.

Micropterus dolomieu JORDAN, Manual Vertebrates, 120, 1888.

Specific Descriptions.

Micropterus salmoides Nelson, 1876.—"Like the proceding [*M. nigricans*], found in all parts of the state, and in nearly equal numbers."—(Nelson, *Partial Cat. Fishes Ills.* <*Bull. Ills. State Lab. Nat. Hist.*, i, 37, 1876.)

Micropterus salmoides Cope, 1881.—"Small-mouthed; scales of trunk small (*e. g.*, *lat. line*, 72–75; between lateral line and back, 11 rows). Scales on nape and breast much smaller than those of sides. Scales of cheeks minute (*e. g.*, between orbit and preoperculum, about 17 rows in an oblique line and about 9 in a horizontal one). Scales of interoperculum uniserial, covering only about half the width of the bone. Scales of preopercular limb none. Scales on dorsal developed as a deep sheath (involving last spine) of small scales differentiated from those on the back, and with series advancing high up the membrane behind each ray (except last two or three). Scales on anal ascending high behind each ray. Mouth moderate. Supramaxillary ending considerably in front of hinder margin of orbit (about under hinder border of pupil). Dorsal rays articulated, 13; anal, III, 10–11; pectoral, I, 16–I, 17. Dorsal fin little depressed, the ninth spine being only about a half shorter than the longest (3, 4, 5), and a fourth shorter than the tenth."—(Cope, *Fishes of Pa.* <*Rept. Pa. Fish Com.*, 130, 1881.)

Micropterus dolomieu Jordan and Gilbert, 1882.—"Body ovate-fusiform, becoming deeper with age. Head large. Mouth large, but smaller than in *M. salmoides*, the maxillary ending considerably in front of the hinder margin of the orbit. Scales on the cheek minute, in about 17 rows; scales on the trunk comparatively small. Dorsal fin deeply notched, but less so than in *M. salmoides*, the ninth spine being about half as long as the longest, and not much shorter than the tenth. Coloration quite variable, the young dull golden-green, with bronze luster; darker spots along the sides, which tend to form short vertical bars, but never

a dark lateral band; 3 bronze bands radiating from eye across cheeks and opercles; a dusky spot on point of operculum; belly white; caudal fin yellowish at base, then black, with white tips; dorsal with bronze spots, its edge dusky. In some waters the fin-markings are obsolete, but usually they are very conspicuous in the young. Southern specimens usually have the scales of the lower part of the sides with faint dark streaks; adult specimens have all these marks more or less wholly obliterated, and become ultimately of a uniform dead-green, without silvery luster. Head $3\frac{1}{2}$; depth $3\frac{1}{3}$. D. X, 13; A. III, 10 or 11; Scales 11–74–17. Rivers of the United States, from the Great Lake region to South Carolina and Arkansas; abundant, frequenting running streams, and preferring clear and cool waters; its southern limit is bounded by the presence of such waters. As a game-fish this species is usually more highly valued than its congener."—(JORDAN and GILBERT, *Syn. Fishes N. A.* <*Bull. U. S. Nat. Mus.*, xvi, 485, 1882.)

MICROPTERUS DOLOMIEU Jordan, 1882.—(Same description as the preceding one.)—(JORDAN, *Geol. Surv. Ohio*, iv, 948, 1882.)

MICROPTERUS DOLOMIEI Bean, 1883.—"This is a beautiful and hardy game fish, extensively taken by artificial as well as natural baits, and largely sold in the markets."—(BEAN, *Bull. U. S. Nat. Mus.*, xxvii, 464, 1883.)

MICROPTERUS DOLOMIEI Goode, 1884.—"The small-mouth is found north to latitude 47° and west to Wisconsin, while southward it ranges to latitude 33°, where Professor Jordan found it in the headwaters of the Chattahoochee and Ocmulgee rivers, the latter being the only instance of its presence in a stream emptying east of the Alleghanies into which it is not known to have been introduced by man."—(GOODE, *Fishery Industries of U. S.*, sec. i, 401, 1884.)

MICROPTERUS DOLOMIEI Forbes, 1884.—"Abundant in rivers and larger creeks, but occurring more rarely in lakes, preferring

swifter water than the preceding [other] species. It occurs throughout Illinois, but is relatively rare to the southward. Has been taken by us in the Wabash and some other of its larger tributaries, but not elsewhere south of the Illinois river."—(FORBES, *Cat. Native Fishes Ills.* <*Rept. Ills. State Fish Com*, 67, 1884.)

MICROPTERUS DOLOMIEU Gill, 1885.—"The small-mouthed Black Bass has the mouth comparatively small, and the maxillary of the adult does not extend beyond the orbit; the scales are considerably smaller, there being seventy-two to seventy-five along the lateral line, and as many as ten or twelve rows between the lateral line and back. It does not extend north of the region of the great lakes, and is not known to reach farther south than South Carolina and Arkansas. In most places it is associated with the large-mouthed species. It does not, as a rule, reach as large a size as its relative."—(GILL, *Standard Nat. Hist.*, vol. iii, 231, 1885.)

MICROPTERUS DOLOMIEU Mather, 1886.—"The small-mouth was introduced into Brown's tract inlet, flowing into Racquette lake, some years ago, by the New York Fish Commission, and now they are plentiful in the lake and are working down into Forked lake and toward Long lake. . . . There is a prevalent theory that this species is 'gamier' than its cousin, the bigmouth or 'Oswego' Bass, an opinion that I am not prepared to indorse, as I have found but little difference between them when both were under two pounds weight."—(MATHER, *Colvin's Adirond. Surv., Fishes*, 5, 1886.)

MICROPTERUS DOLOMIEU Jordan and Evermann, 1886.—"This species is usually placed first among the game fishes of the state. It frequents clear waters, especially those with some current, and is averse to mud. It is much less frequently found in ponds than the large-mouthed Bass."—(JORDAN and EVERMANN, *Ind. Agric. Report*, 13, 1886.)

MICROPTERUS DOLOMIEI Goode, 1888.—"The oldest name for

the large-mouth is *Micropterus salmoides;* and for the small-mouth, as Henshall has proved, *Micropterus dolomiei.* It is hoped that this decision, which is grounded upon a firm foundation of priority, may be permitted to stand unchanged."—(GOODE, *American Fishes*, 54, 1888.)

MICROPTERUS DOLOMIEU Jordan, 1888.—"Body ovate-oblong, growing deep with age; scales on the cheek small, in about 17 rows; dorsal less deeply notched than in the next [*M. salmoides*]; the ninth spine about half as long as the longest. Coloration variable; the young dull golden-green, with darker spots on sides, which tend to cluster in short vertical bars; three bronze bands across cheeks; caudal yellowish, next black, with a white tip; dorsal with bronze spots. Adult nearly uniform olive-green. Head, $3\frac{1}{2}$; depth $3\frac{1}{3}$. D. X, 13. A. III, 10. Scales, 10 or 11–72 to 75–17. L. 1 to 2 feet; weight, 2 to 7 pounds."—(JORDAN, *Manual of Vertebrates*, 120, 1888.)

MICROPTERUS SALMOIDES (LAC.) HENSHALL.

THE LARGE-MOUTHED BLACK BASS.

ADDITIONAL SYNONOMY AND REFERENCES.

1849—*Grystes salmoides* HOLBROOK, Cat. Fauna and Flora. <Statistics of Ga., 16.

Micropterus salmoides MCKAY, Pro. U. S. Nat. Mus., iv, 93, 1881.

Micropterus salmoides GOODE and BEAN, Pro. U. S. Nat. Mus., v, 238, 1882.

Micropterus salmoides JORDAN and GILBERT, Syn. Fishes N. A., 484, 1882.

Micropterus salmoides JORDAN, Geol. Surv. Ohio, iv, 952, 1882.

Micropterus salmoides HAY, Bull. U. S. Fish Com., ii, 64, 1882.

Micropterus salmoides BEAN, Bull. U. S. Nat. Mus., xxvii, 446, 502, 1883.

Micropterus salmoides GOODE, Fish. Industries U. S., sec. i, 401, 1884.

Micropterus salmoides GILBERT, Pro. U. S. Nat. Mus. vii, 204, 209, 1884.

Micropterus salmoides JORDAN, Pro. U. S. Nat. Mus., vii, 320, 1884.

Micropterus salmoides FORBES, Rept. Ills. Fish Com., 67, 1884.

Micropterus salmoides GILL, Standard Nat. Hist., iii, 231, 1885.

Micropterus salmoides JORDAN, Cat. Fishes N. A., 17, 1885.

Micropterus salmoides JORDAN and MEEK, Pro. U. S. Nat. Mus., viii, 14, 16, 17, 1885.

Micropterus salmoides GOODE and BEAN, Pro. U. S. Nat. Mus., viii, 208, 1885.

Micropterus salmoides JORDAN and GILBERT, Pro. U. S. Nat. Mus., ix, 21, 1886.

Micropterus salmoides BOLLMAN, Pro. U. S. Nat. Mus., ix, 464, 1886.

Micropterus salmoides EVERMANN, Bull. Brook. Soc. Nat. Hist., ii, 7, 1886.

Micropterus salmoides JORDAN and EVERMANN, Ind. Agric. Rept., 13, 1886.

Micropterus salmoides JENKINS, Hoosier Naturalist, 95, 1886.

Micropterus salmoides VON DEM BORNE, Schwarzbarsch, etc., 3, 1886.

Micropterus salmoides GOODE, American Fishes, 54, 1888.

Micropterus salmoides JORDAN, Manual Vertebrates, 120, 1888.

1876—*Micropterus nigricans* Nelson, Bull. Ills. State Lab. Nat. Hist , i, 36.

1879—*Micropterus pallidus* Goode, Bull. U. S. Nat. Mus., xiv, 49.

Micropterus pallidus Goode, Bull. U. S. Nat. Mus., xviii, 28, 1880.

Micropterus pallidus Bean, Pro. U. S. Nat. Mus., iii, 96, 1880.

Micropterus pallidus Hay, Pro. U. S. Nat. Mus. iii, 497, 1880.

Micropterus pallidus Cope, Rept. Pa. Fish Com., 131, 1881.

1880—*Micropterus floridanus* Cope, Bull. U. S. Nat. Mus., xvii, 31.

1885—*Micropterus salmonoides* Von dem Borne, Fischzucht, 148.

Specific Descriptions.

Micropterus nigricans Nelson, 1876.—"Found in great abundance throughout the state [Illinois], as far as I can learn. The young are found in myriads in the ditches draining the marshes along the Calumet river."—(Nelson, *Cat. Fishes Ills.* <*Bull. Ills. State Lab. Nat. Hist.*, i, 36, 1876.)

Micropterus pallidus Hay, 1880.—"This species is abundant every-where [in Mississippi], and is esteemed as one of the best food fishes. It is called "Trout," instead of "Bass," as at the North. The young are conspicuously marked by a dark, sometimes interrupted, lateral band. This is sometimes found also in the adults. There is often a small patch of feeble teeth on the tongue of both this species and *M. salmoides* [*M. dolomieu*]." —(Hay, *Pro. U. S. Nat. Mus.*, iii, 497, 1880.)

Micropterus floridanus Cope, 1880.—"It appears then, that the only important character which distinguishes the Texan form from the Floridian is the much smaller size of the cheek scales. I do not know how constant this character will prove.

Perhaps some of the names recently given to the Mexican forms may be applicable to a variety so defined. The Llano [Texas] fish is rather light colored; and there is a dusky line along the middle of each row of scales, which are especially distinct below the lateral line."—(COPE, *Bull. U. S. Nat. Mus.*, xvii, 32, 1881.)

MICROPTERUS PALLIDUS Cope, 1881.—"Large mouthed. Scales of trunk moderate (*e. g.*, *lat. line*, 65–70; between lateral line and back, $7\frac{1}{2}$ or 8 rows). Scales on nape and breast scarcely (on nape), or not much (on breast), smaller than those of sides. Scales of cheeks moderately small (*e. g.*, between orbit and preoperculum, about ten rows in an oblique line and about 5–6 in a horizontal one). Scales of interoperculum uniserial, covering the entire width of the bone. Scales of preopercular limb developed in an imperfect row (*e. g.*, 3–5 in number). Scales on dorsal developed as a low (obsolete) shallow sheath, and with series ascending comparatively little on membrane behind the rays (none behind last five or six). Scales on anal none (or very few). Mouth large. Supramaxillary extending considerably behind the posterior margin of orbit. Dorsal rays articulated, 12 (I, 11); anal, III, 10; pectoral, I, 14 (1, 14). Dorsal fin much compressed [depressed?], the ninth spine being only about a fourth as long as the longest, and half as long as the tenth."—(COPE, *Fishes of Pa.* <*Rept. Pa. Fish Com.*, 131, 1881.)

MICROPTERUS SALMOIDES Jordan and Gilbert, 1882.—"Body ovate-fusiform, becoming deeper with age, moderately compressed. Head large. Mouth very wide, the maxillary in the adult reaching beyond the eye; in the young shorter. Scales on the cheek in about 10 rows; scales on the trunk comparatively large. Lingual teeth sometimes present. Dorsal fin very deeply notched. Coloration of the young dark-green above; sides and below greenish-silvery; a blackish stripe along the sides from

opercle to the middle of the caudal fin; three dark oblique stripes across the cheeks and opercles; below and above the lateral band some dark spots; caudal fin pale at base, then blackish, whitish at tip; belly white. As the fish grows older the black lateral band breaks up and grows fainter, and the color becomes more and more of a uniform pale, dull green, the back being darker; a dark opercular blotch usually present. Head $3\frac{1}{4}$; depth 3. D. X, 13; A. III, 11; scales 8–68–16. L. 1–2 feet. Rivers of the United States, from the Great Lakes and Red river of the North to Florida and Texas; every-where abundant, preferring lakes, bayous, and sluggish waters. It grows to a larger size than the next species [*M. dolomieu*], and is readily distinguished by its coloration and the larger mouth and larger scales. Both species vary much with different waters."—(JORDAN and GILBERT, *Syn. Fishes N. A.* <*Bull. U. S. Nat. Mus.*, xvi, 484, 1882.)

MICROPTERUS SALMOIDES Jordan, 1882.—(Description same as the preceding.)—(JORDAN, *Fishes of Ohio.* <*Geol. Surv. Ohio*, iv, 952, 1882.)

MICROPTERUS SALMOIDES Hay, 1882.—"An abundant fish every-where [Lower Mississippi Valley]. The young are found in every pond. . . . I have never succeeded in finding in the South a specimen of the small-mouthed Black Bass, *Micropterus dolomieu* Lac."—(HAY, *Bull. U. S. Fish Com.*, ii, 64, 1882.)

MICROPTERUS SALMOIDES Bean, 1883.—"This species is generally abundant and grows to a larger size than the small-mouthed Bass; it is especially common west of the Alleghanies, and in the Southern States; it is an important food-fish and affords considerable sport to anglers."—(BEAN, *Bull. U. S. Nat. Mus.*, xxvii, 446, 1883.)

MICROPTERUS SALMOIDES Goode, 1884.—"The large-mouth ranges farther to the west and north, occurring in the Red River of the North, perhaps as far as Manitoba, in latitude 50°. It abounds in all the rivers of the Southern States, from the James to the St. John, and in the lower reaches of the streams and bay-

ous connected with the Gulf of Mexico, around to Texas, in latitude 27°."—(GOODE, *Fishery Industries U. S.*, sec. i, 401, 1884.)

MICROPTERUS SALOMIDES Forbes, 1884.—"The large-mouthed Black Bass favors especially lakes, ponds and sluggish waters, but occurs also in rivers and large creeks throughout Illinois. It is the common southern form of Black Bass, although perhaps, on the whole, no more abundant there than in the northern part of the state."—(FORBES, *Cat. of Native Fishes Ills.* <*Rept. Ills. State Fish Com.*, 67, 1884.)

MICROPTERUS SALMOIDES Gill, 1885.—"The large-mouthed Black Bass has the mouth deeply cleft, so that the maxillary of the adult extends back of the orbit; the scales are quite large, there being sixty-five to seventy in the lateral line, and the number of rows between the lateral line and the back is only seven or eight. The distribution of this form is very wide, and it extends from the British provinces southward in one direction to Florida, and in another direction into Mexico."—(GILL, *Standard Nat. Hist.*, vol. iii, 231, 1885.)

MICROPTERUS SALMOIDES Jordan and Gilbert, 1886.—"These specimens [Texas] agree with northern ones in form and squamation. The mouth is, however, a little smaller, and the coloration is somewhat different. The lateral band is broken up into numerous irregular dark cross-streaks, which reach the dorsal fin, and below this there are very distinct longitudinal streaks following the rows of scales. The caudal fin has narrow cross-streaks formed of dark spots."—(JORDAN and GILBERT, *Pro. U. S. Nat. Mus.*, ix, 21, 1886.)

MICROPTERUS SALMOIDES Jordan and Evermann, 1886.—"The young may be known at once by the color, the ground being here much paler than in the other [*M. dolomieu*], and there being a broad blackish band along the sides."—(JORDAN and EVERMANN, *Food Fishes Ind.* <*Ind. Agric. Rept.*, 13, 1886.)

MICROPTERUS SALMOIDES Jordan, 1888.—"Body rather

deeper and more compressed than in the preceding [*M. dolomieu*], growing deeper with age; scales on cheek large, in about 10 rows; ninth dorsal spine not half length of longest. Color dark green, silvery below; sides with a broad blackish band in young, with some dark spots above and below it; three dark stripes across cheeks; caudal pale at base and tip, mesially dusky. Adult dull green, nearly plain. Head $3\frac{1}{4}$; depth 3. D. X, 13. A. III, 11. Scales 8–68–16. L. 1 to $2\frac{1}{2}$ feet; weight 3 to 8 pounds."—(JORDAN, *Manual Vertebrates*, 120, 1888.)

CHAPTER III.

GENERAL AND SPECIAL FEATURES.

As there is a geographical variation between the small-mouthed Bass of the extreme North and South, so also we occasionally find a similar variation in the large-mouthed Bass of the northern and southern portions of the Mississippi Valley.

Prof. Edward D. Cope, when in Texas,* a few years ago, took several large-mouthed Bass, which, while agreeing in all other features with the same species of the North and of Florida, differed somewhat in the smaller size of the scales of the cheeks, and in the squamation of the gill-covers. They also differed slightly in coloration and markings by showing several dusky, longitudinal streaks, especially noticeable below the lateral line.

I observed these several variations, though not quite so pronounced, in several large-mouthed Bass taken in the St. Francis river, Arkansas, in the autumn of 1885.

As to a comparison of game qualities, as between the small-mouthed Bass and the large-mouthed Bass, I still hold that, other things being equal, and where the two species inhabit the same waters, there is no difference in game qualities; for, while the small-mouth is probably more active in its movements, the large-mouthed Bass is more power-

*On the Zoological Position of Texas. By E. D. Cope. <Bull. U. S. Nat. Mus., xvii, 1880, 31.

ful; and no angler can tell from its manner of "fighting," whether he is fast to a large-mouthed or a small-mouthed Bass, until he has the ocular evidence.

But what are the game qualities of a fish? As I understand it, they are: its aptitude to rise to the artificial fly, its readiness to take a natural bait, and its exhibition of strength and cunning, persistence and activity, in its efforts to break away after being hooked.

Both species of Black Bass rise equally well to the artificial fly; though, if there be any difference in this respect, I think the large-mouthed Bass has the advantage. Recently I received a letter from Count Von dem Borne, of Germany (who has been very successful in introducing and propagating the Black Bass in that country), saying that he has observed that the large-mouthed Black Bass rises better to the artificial fly than the small-mouthed Bass. My own experience rather favors this view, and it has likewise been brought to my notice by anglers in various parts of the country.

The current but erroneous opinion that the small-mouthed Bass exceeds the large-mouthed Bass in game qualities, has been very widespread, and has been much enhanced by the indorsement of several of our best ichthyologists, who unfortunately, however, are not, and do not pretend to be, anglers, but who imbibed this opinion second-hand from prejudiced anglers who ought to have known better. But as the Black Bass is becoming better known, and fly-fishing for the species is being more commonly practiced, this unfair and unmerited comparison is fast dying out.

Two or three years ago, the fishery editor of "Forest and Stream," Mr. Fred. Mather, solicited the opinions of anglers on this subject, from which I select a few from

various parts of the country. Mr. Mather inaugurated the discussion as follows:

"We have for many years been of the opinion that the big-mouthed Black Bass has been underrated as a game fish, when found in Northern waters. About the time when Dr. Gill first showed that there were only two species of Black Bass, instead of a dozen or so, some one praised the fighting qualities of the small-mouth, and denounced the other as a 'vulgarian,' with no dash in him. This has been repeated so often that it is generally believed, and the fish has never recovered from the bad name given to it, undeservedly, as we think. Last month we were Bass fishing with a gentleman who was strongly prejudiced against the big-mouth; but, on taking a two-pounder, which he declared before seeing it must weigh twice that figure, and 'was no big-mouth,' he gave in, and acknowledged that there was more fight in the fish than he had ever given it credit for."

In the summer of 1885, I was at Gogebic lake, Wisconsin, where, among a number of prominent anglers, were Dr. F., and Dr. T., both of New York City. Dr. F. has had a very extensive angling experience in all parts of the country, and Dr. T is well known as a participant in the fly and bait-casting contests in the tournaments of the National Rod and Reel Association, at New York.

Dr. F. was a firm believer in the superior game qualities of the small-mouthed Bass, and declared that he could invariably tell what species of Black Bass he had hooked, from its manner of "fighting." Dr. T. was confident he could not do so. The matter was finally put to a practical test, when Dr. F. was forced to acknowledge himself vanquished, and that he nor any other angler could make the distinction, for one fish was as "gamy" as the other. I

might add that this result will be obtained wherever the two species exist in the same waters.

I give the opinions of a few anglers who have fished for both species in the *same waters*, as all other comparisons are of no weight. A small-mouthed Bass in a swift, rocky stream is, as a matter of course, superior in gameness to a large-mouth in a weedy pond, and this holds good as to the brook trout or any other game-fish.

A gentleman ("Opinicon") of Utica, N. Y., expresses himself as follows:

"Pound for pound the small-mouth excels its brother, the large-mouth, as a game fish, but in this respect only; taken in cold or deep water, the large-mouth Bass, when running from two to six pounds, offers to the angler using fine tackle as good sport as could be desired. The writer has, from choice, angled for the large-mouth in preference to the other, principally for the reason that the former were of good size. During the past summer, while fishing on a lake forming a part of the St. Lawrence river, from one side of the skiff could be taken the small-mouth of one and a half pounds, and from the other side, in the same water, large-mouths, weighing from three to five pounds. These fish were full of life and game.

"The main difference between the two kinds of Black Bass being, aside from weight, that when struck, the large-mouth less frequently broke water, though they would sulk and fight for every inch of line with as much determination as ever shown by the small-mouth, and the angler having one on his hook had business on hand."

"Kingfisher," of Cincinnati, Ohio, says of the large-mouthed Bass:

"Since we began fishing the North Michigan waters I have be-

come better acquainted with them, and have handled them till my arm has been tired out. I am not going to say they are not good, hard fighters for a while, but they seem to lose heart in the struggle after a few rushes, and it would be hard to convince me that they are any thing like the equal of the small-mouth in dash, tireless vigor of action, and every thing that counts in the make-up of a thoroughly game fish."

"Dubuque," of Dubuque, Iowa, has this to say:

"For the past twenty years I have taken these fishes in the Mississippi river with rod and reel, and while I have found individuals of both species which were lacking in game qualities, I have also found those which excelled in them. I have taken the big-mouth when I thought its gameness could not be excelled, and again when it came in like a stick. The same can be said of the small-mouth. As a rule, I think that your opinion that these fishes do not fight in proportion to their weight when they are above two pounds in weight, is correct, but there are individual exceptions even to this.

"Last week I took several of each species, and before bringing them to net took note of their gameness in advance of knowing the species, and in my opinion it is impossible for one to determine, with any degree of accuracy, which fish has been hooked by its fighting qualities, when fishing in the Mississippi river."

I think that the general opinion in Central New York is in favor of the small-mouthed Bass as a game fish, or that this opinion is more pronounced in that section than in any other with which I am acquainted. There is evidently something wrong with the large-mouthed Bass of the mentioned locality, for Ira Wood says of this species, in Kinderhook lake, near Albany:

"The lake is shallow, muddy and warm, and the fish are all

head, tail and skin; and, after being stripped of these, if you find any meat left, it is muddy in taste; any thing but a gamy fish to catch, or a game fish to eat."

"Syracuse," of Syracuse, New York, shares this general opinion, as the following shows:

"There is more fight and more game, more cussedness and more endurance, in a one and a half pound small-mouth Black Bass having barred sides, than in a three-pound large-mouth; and both will deceive when first hooked, the first by being less weight, and the other being more; and, while both are good enough, I prefer the small-mouth every time."

Mr. S. C. Clarke, a veteran angler of fifty years' experience, and whose opinion is entitled to great weight, says:

"I will say that, from an acquaintance with both species for more than forty years, from Minnesota to Florida, I have found little or no difference between them. I have taken them with fly, spoon, and bait, as many as fifty in a day (in early times), and up to six and a half pounds weight."

"Salmon Roe," of Newport, Arkansas, offers the following testimony:

"Last year I spent some time investigating the comparative gaminess of the small-mouth and the big-mouth Black Bass in the Little Red River of Arkansas, where both species exist in about equal numbers, the one in the swift shoaly places, and the other in the slack water or 'holes' of that stream. I started in without prejudice, and came out with an impression favorable to the big-mouth. . . .

"Of course, there is a difference in the 'manner' of the two fishes. The big-mouth, for instance, in the stream to which I have alluded, takes the fly much more freely than his neighbor,

and fights with at least equal determination after taking. In using the trolling spoon in clear water, I have frequently observed that the small-mouth will follow the lure for a while, and abandon the pursuit without an attempt to capture. This I have never known the big-mouth to do. He starts for it, goes straight to it, takes it, and fights it out on that line. There is nothing indirect about him—until he is hooked. Then he will cut the line on rocks, wind it about snags, tangle it among weeds, and do very many highly reprehensible things. In this regard he is no worse, however, if he be so bad, as his sly neighbor the small-mouth."

"Cyrtonyx," of Fort Stanton, New Mexico, is a very close and reliable observer, and a good angler and fly-fisher; out of the abundance of his heart his mouth speaketh:

"I have caught the large-mouth Black Bass from the southern part of Louisiana, through most of the Gulf States, and northward, and I have always found that they not only rise splendidly to the fly, but that I have caught as big ones as by bait-fishing. On the other hand, the small-mouth does not take the fly freely (remember I am speaking of legitimate fly-fishing, not trolling with flies), and it is but the small ones that take it at all, as a rule. The big-sized small-mouths are seldom caught that way. Four years ago I saw a number of complaints about the Black Bass not being a reliable fish for the fly, etc., but nearly all these articles were from Pennsylvania, New York and Ohio, and referred to the small-mouth. If the writers had tried the large-mouth, they would probably have changed their opinions. I have caught the large-mouth Black Bass in running waters, in ponds, and in lakes. Swift running water is the best for fly-fishing. The statement that they invariably like mud and weeds, and go nowhere else, is simply not true.

"I have caught the large-mouth in the Amite, in East Baton Rouge Parish, La., as clear and pure a river as any trout stream

I ever saw in New England or Canada, and I have fished, when a boy, in many of the waters of that section. The upper Ouachita, in Arkansas, is another clear stream, and is full of them, as are all the clear rivers and creeks through the piny woods in Alabama and Mississippi."

"Lambert," of Erie, Pennsylvania, is almost persuaded:

"Since reading your article on the game qualities of the two Black Basses, some weeks ago, I have been taking notice of the way in which they fought. Previous to this, I accepted the common notion that the small-mouth was the best fighter, but after careful observation I must admit that I am in doubt about it. Within the past three weeks I have taken about one hundred fish of both kinds, but am not fully prepared to admit that the big-mouth is the equal of his brother, yet I will say that he is a better fighter than I had given him credit for. This is one effect of popular prejudice. I had never before heard it questioned that the common opinion regarding the superiority of the small-mouth might be exaggerated."

"Rob Roy," of Syracuse, whose experience with the large-mouthed Bass seems unfortunately to be confined to Central New York, says:

"Dr. Henshall and Mr. Mather have had wide experience on many waters, and both seem firm in the conviction that the large-mouth is as gamy as the small-mouth. No one who has ever cast a fly in Central New York could hold such an opinion for an instant. The habits of the two fish here are utterly unlike. One lives in sluggish water on mud bottom, the other in deep, clear water, on sand or gravel bottom, or on rapids with rocky bottom. The large-mouth rarely rises to the surface to meet the fly, but generally takes it under water as it is trailing; and, when caught, he sulks near the bottom until he finds that won't do, when he

comes just to the surface, and gives an ugly shake like a bulldog with a cat in his mouth. He never makes bold leaps for freedom nor desperate runs. The small-mouth, on the contrary, is all game. The instant he strikes he goes for deep water to enjoy his morsel in peace, but when he feels the sharp sting of the hook, as though suddenly realizing his danger, he makes a grand leap for life and freedom, frequently rising three, four, and five feet clear of the water. If that fails, he rushes for deep water with an energy and power that thrills and delights the fly-caster. And he gives up only after a desperate struggle. I have known small-mouth Bass to leap clear of the water five or six times before submitting to be netted. Did any large-mouth ever do as much? The small-mouth, again, fights with his mouth shut, while the large-mouth comes to the net with jaws gaping like a pickerel on a trolling line."

"Rob Roy" shows himself in the above to be quite imaginative and very prejudiced. No Bass ever leaped "five feet." No Bass, large or small-mouthed, ever "sulked." A Bass, or any other fish, will fight with its mouth open or shut according to the part of the mouth it is hooked in. When caught, the large-mouth "sulks near the bottom," but the small-mouth goes to the same place to "enjoy his morsel in peace." How does "Rob Roy" know this?

In contrast to the above note the following from "E. F.," of Chicago:

"I have fished for Bass in some of the Northern lakes, the Delaware, Susquehanna, Alleghany, Potomac, Shenandoah, and some smaller streams, also in Florida and other Southern States. As I have never caught a large-mouth Bass in running water, I can not give an opinion as to the relative gameness of the two fish. I will say one thing in favor of the large-mouth fish which, to me, covers a multitude of sins, and that is, he is a

splendid riser, frequently throwing himself completely out of water as he takes the fly, and always showing a good part of his body. The small-mouth rises in a sluggish manner, and often sucks in the fly after the manner of the plebeian sunfish. The large-mouth Bass caught with the fly have been as large as those caught with live bait.

"In ten years fly-fishing for small-mouth Bass I have caught very few large fish. During these years I have spent three months each season by the river side, and have fished at least two days each week. A large fish has occasionally been caught, but I have looked upon them as lucky accidents."

I could give fully fifty more opinions on this subject, but they would be merely repetitions of the above. I advise every angler to investigate this matter for himself, and without bias. If he finds that the big-mouth is just as good a game-fish as the small-mouth, he is just that much better off.

CHAPTER IV.

COLORATION OF THE BLACK BASS.

The coloration of the young of the small-mouthed Bass is light green, with golden reflections, and with numerous small dots or punctulations, which aggregate in small clusters, approaching somewhat the appearance of vertical bars. Iris, golden. Base of caudal fin yellowish, tip whitish, and dark olivaceous or blackish in the middle.

In the young of the large-mouthed Bass the color is also greenish but darker, with a blackish band along the lateral line, and clusters of dark spots above and below. Iris, golden. Base and tip of caudal fin somewhat paler than the middle.

Those who keep their fish alive in fish-cars, live-boxes, etc., or by the more reprehensible practice of stringing the fish, will observe, that however different in coloration fishes of the same species may appear when first caught, that after being subjected to the same conditions for a few hours they will all exhibit the same coloration.

Another instance of the change of coloration due to environment, or change in the condition, character, depth and temperature of the water, or in the food, is seen in the Canadian sea-trout. This is merely the brook-trout that has become anadromous and runs to the sea. When it returns, in the spring or early summer, to the mouths of the streams, it is, like most marine fishes, of a bright, silvery appearance; but after being in fresh water a short time it

takes on the characteristic colors and spots of the brook-trout.

The external coloration of fishes depends on the presence of variously-colored pigment-cells in one or both layers of the skin. These pigment-cells are under the influence or control of the nervous system, and are able to cause changes of color which may be rapid or temporary, or more or less permanent.

In some fishes, as the Black Bass, the change in coloration is involuntary, and is, without much doubt, occasioned by an increase or decrease in the number of the different pigment-cells, owing to the influences of light, depth of water, temperature, surroundings, etc.

In some other fishes the change of coloration is much more rapid, and seems to depend on a contraction or expansion of the pigment-cells already developed, and which are very sensitive to surrounding conditions, especially to light. Owing to this rapid change in the colors of certain fishes, when exposed to the light, they are thought by some to be endowed with the power of changing their colors at will, or voluntarily. This, however, is not very likely.

CHAPTER V.

GEOGRAPHICAL DISTRIBUTION.

In this brief paper,* the writer intends merely to give the facts, as they exist, relative to the distribution of the Black Bass species, without attempting to draw any conclusions therefrom, or from the laws which govern the geographical distribution of fresh-water fishes, or to offer any theory concerning the same. A study of the habitat of the Black Bass, however, will, no doubt, aid the biologist very materially in solving the problem of the distribution of animals.

The geographical distribution of the Black Bass is remarkable for its extent; the original habitat of one or other of the two species ranging from Virginia to Florida, and from Canada and the Red river of the North to Louisiana and East Mexico. In other words, it might be stated that the original geographical range of this representative American fish embraced the whole of North America, south of the British possessions and east of the Rocky Mountains, except the waters flowing into the Atlantic in New England and the Middle States, thus far excelling any other fish of America in its distribution. Of the two species, the large-mouthed Bass had the widest distribution, occurring all through the vast scope of territory mentioned

* On the Distribution of the Black Bass. By Dr. James A. Henshall. <Proceedings American Fishcultural Association, 1883.

above. The small-mouthed Bass had a somewhat limited range in comparison, not extending east or south beyond the Alleghany mountains, though occurring every-where else with the large-mouthed species.

At the present day, the habitat of the Black Bass has been extended by transportation, and by means of artificial canals, so that it may be said to inhabit every state of the Union. It has also been successfully introduced into England, Scotland and Germany, thus occupying a wider range than any fresh-water fish in the world.

The fact that the original habitat of the Black Bass does not embrace New England and the Pacific slope is not remarkable, for the characteristically American forms of fishes, as has been observed by Professor Jordan, are, generally speaking, rare or absent in the waters of these sections. This fact was noticed by Professor Louis Agassiz, who called New England "a zoological island," on account of its faunal peculiarities as compared with the rest of the United States. Thus, of more than a hundred genera of fresh-water fishes now known to occur in the waters east of the Mississippi river, only about one-fourth occur in New England, and of these all except a half-dozen genera are represented by but a single species each; and not more than thirty-five genera occur in the waters of the Pacific slope. Almost any stream of any extent of the Ohio or Mississippi basins will furnish double the number of genera and species as the entire waters of either of the above-named sections. Thus, as Professor Jordan states, "In the little White river, at Indianapolis, seventy species, representing forty-eight genera, are known to occur—twice as many as inhabit all the rivers of New England."

The distribution of the Black Bass does not seem to be

much affected by geological formations, climatic influences, or the character of waters; for although one or both species may have been absent originally in certain localities, they readily adapt themselves to the waters of these sections when transplanted, and rapidly increase.

Originally, both species were at home among the primordial rocks of the eozoic period of Lake Champlain, Northern Wisconsin, and along the Appalachian chain in the Carolinas and Northern Georgia. They flourished amid the paleozoic rocks of the Great Lake region and the Mississippi valley, and in the coal measures of the Ohio, Illinois, and Missouri river basins; while in the marine tertiary formations of the cenozoic period, along the Atlantic and Gulf slopes of the Southern States, the large-mouthed Bass alone occurs. Thus, while the small-mouthed Bass seems to be restricted naturally to the older formations, the large-mouthed Bass roams at his own sweet will through the regions of metamorphic and stratified rocks and glacial drift, down to the recently formed coral rocks of the Peninsula of Florida.

Climatic influences do not seem to affect the distribution of the large-mouthed Bass in any degree, in the United States, and of the small-mouthed Bass only to a small extent. The original habitat of the species extended through twenty-five degrees of latitude and thirty degrees of longitude, the small-mouthed Bass alone not occurring in the extreme ten degrees of southern latitude, and the ten degrees of extreme western longitude of this range. Thus, while the small-mouthed Bass is naturally restricted to cold and temperate waters, the large-mouthed Bass bids defiance alike to the ice-bound streams of Canada, the tropical lagoons of East Mexico, and the sunny streams of Southern

Florida. He flashes his bright armor under the firs and birches of the St. Lawrence basin, and erects his spiny crest in the grateful shade of the palms and live oaks of the southern peninsula. To him it is given

> "To bathe in fiery floods, or to reside
> In thrilling regions of thick-ribbed ice."

The character of waters has but little influence upon the distribution of the species, less upon the large-mouthed Bass than upon his small-mouthed congener. If the water is reasonably pure, both species will thrive in it; but, as has just been intimated, the small-mouthed Bass naturally seeks cooler and clearer waters. Thus, while he is found in the head-waters of certain rivers flowing into the Atlantic (notably those of the Alleghany region of the Carolinas, Georgia, and Alabama), co-existing with the large-mouthed Bass, the latter only occurs in the lower portions of the streams. There are several rivers in Hernando county, on the Gulf coast of Florida, that burst out from the base of a sandy ridge running parallel with the coast, and some twelve miles from it, whose sources are large springs, fifty or sixty feet deep, and of half an acre in extent. Their waters are remarkably clear and cool, with a strong current until tide-water is reached; and I have no doubt but the small-mouthed Bass would thrive wonderfully well in the upper portions of the streams if introduced into them, as the conditions all seem favorable, and the large-mouthed Bass is very abundant in them.

As we approach tide-water, the small-mouthed Bass disappears. The large-mouthed Bass, however, true to his cosmopolitan nature, descends the streams to their mouths, where he seems to be as much at home in the brackish

waters of the estuaries as in the pure and crystal rapids of the highlands.

The Black Bass being in a manner omnivorous, is probably not restricted in its range to any great extent by the supply of any one article of his food; though it would be affected, of course, by an abundance or scarcity of its food, as a whole. Crawfish and minnows are the principal food of adult Black Bass, and these are more or less plentiful throughout the waters of the United States. In addition to these, they feed upon insects, larvæ, frogs, etc. Professor S. A. Forbes, in his studies of the food of fishes, ascertained that the food of young Bass, when less than an inch in length, consisted entirely of minute crustacea (*Entomostraca*). When from one to four inches long, they feed almost wholly upon insects; while crawfish and small fishes constituted the principal diet of adult Bass, the small-mouthed species showing an especial fondness for the former. The greater prevalence of crawfish in clear, rocky streams, may throw some light upon the preference of small-mouthed Bass for such waters.

I wish to say a word in this connection in reference to objections heretofore urged before this Association against the introduction of the Black Bass into Eastern waters, upon the theory that the presence of the "voracious" Bass would militate against the increase of shad or salmon. The objections are not valid, or founded on fact; for the Black Bass prefers a diet of crawfish, when he can get it, varying it with minnows, insects, larvæ, and frogs, and in Eastern waters he would not object to young eels. The pike, pickerel, pike-perch, and gar-fish, are almost entirely piscivorous in their habits, which might be expected from the character of their teeth, and their sins have no doubt

been charged to the Black Bass. But, while the Bass will take in a young shad or salmon if it comes his way when hungry, he will not make them special objects of pursuit, like the canine-teethed fishes above named.

The failure to restock such streams, if any such failure exists, must be attributed to other causes than the introduction of the Black Bass, prominent among which is the unrelenting pursuit of the young fry by the predatory fishes mentioned. They are only exceeded in their destructiveness by the genus *Homo*, with his miles of gill-nets at the mouths of the streams, to prevent the return of the shad or salmon during the breeding season; and should a few run the gauntlet and succeed in depositing their spawn in the upper reaches of the rivers, the eels, bullheads and suckers take good care of it. All of which is truly deplorable, and deplorably true. But in your just and righteous indignation do not make a scape-goat of so good a fellow as the Black Bass.

In Western waters where the Bass exists with the usual varieties of fishes, there is no perceptible decrease in the numbers of either. If any species suffers it is always the Black Bass on account of over-fishing, spearing, etc. I know of isolated lakes in Wisconsin where the Black Bass has co-existed with the cisco (one of the salmon family), longer than the memory of man runneth to the contrary, without a decrease of the latter fish. If then the Bass can not "get away with" the cisco in confined waters, how can he "clean out" the shad or salmon in large flowing streams? Moreover, I know of a small stream that abounded in Black Bass and crawfish, into which brook-trout were introduced to the discomfiture of the former fish, for the trout increased

while the numbers of the Bass grew smaller by degrees and beautifully less.

If, then, there are waters in which the brook-trout or the rainbow-trout will not thrive, do not hesitate to aid in the further distribution of the Black Bass by introducing that desirable species. It is easily done, and success is already assured. You have only to look to the Potomac, the Susquehannah, the Delaware and many other streams for evidence of its rapid increase in new waters.

The Black Bass is excelled by no other fish that swims for gameness, and among fresh-water species by but one, the white-fish, for the table. And, furthermore, he will not eat the spawn of his mate, nor that of his fellows' mates. His natural food is the crawfish and the minnow; he prefers them, and they are easily procured. On them he will wax and grow fat, increase and multiply. The man who alleges that he depopulates the streams of valuable food fishes, or asserts that he "kills for the love of it," has never looked into the mouth of the Bass with his eyes open.

CHAPTER VI.

HABITS OF THE BLACK BASS.

Spawning and Hatching.

The female Black Bass yields from five thousand to twenty thousand eggs, according to age and weight. The eggs are of the adhesive or glutinous class, and can not be manipulated in the same way as those of the salmon, trout, or shad (which latter are non-adhesive or separate) by the pisciculturist. The eggs are inclosed or enveloped in glutinous bands or ribbons of an adhesive character, which sink at once to the bottom of the nest and become glued to the pebbles, rocks, sticks, etc.

Major Isaac Arnold, Jr., while in command of the Arsenal, at Indianapolis, Indiana, prepared a small pond in the grounds and stocked it with small-mouthed Bass from White river and Fall creek. For several years he had the opportunity of closely observing the fish during the breeding season, and records the following interesting data:*

"I placed the Bass in the pond for the sole purpose of noticing them during the breeding season, but the water in the pond was so crowded with a growth of algæ that my observations have not been satisfactory. I think the female prepares the spawning ground or bed, after which the male joins her. Whilst the female is preparing the bed the males fight with each other for

* Successful Propagation of Black Bass. By Major Isaac Arnold, Jr., U. S. A. <Bulletin U. S. Fish Commission, ii, 1882.

possession. . . . The male presses the roe from the female by a series of bites or pressures along her belly with his mouth, the female lying upon her side during the operation. The male ejects the milt upon or over the roe from time to time, and the spawning process lasts for two or three days. When the spawning is over, the male disappears from the scene, and the female remains upon the nest extremely pugnacious, allowing nothing to approach until the eggs have hatched and the young fry are a week or ten days old. The young fish commence at once to prey upon each other and continue until they are two or three weeks old, when cannibalism ceases and there is no more danger from that source."

This accords, in the main, with my own observations, though I have never observed the male biting or pressing the abdomen of the female with his mouth; this feature, however, has been confirmed by Mr. Geo. C. Rixford, of Rixford, Florida, who observed the occurrence in that state. It would seem, then, that this proceeding is common to both species, as Major Arnold's observations were confined to the small-mouthed, and those of Mr. Rixford to the large-mouthed Bass.

I have often seen the female alone, and sometimes the male, and sometimes both together, spinning rapidly around the nest, upon their sides, ejecting the eggs or milt, which sank at once to the bottom. When the fish were in pairs, the edges of their bellies would be toward each other, sometimes in contact, as they circled around quite close to the bottom, with jerky, tremulous motions; but I never saw the male pressing the spawn from the female with his mouth.

I record the following interesting item for the benefit of

future observers. My own opinion is that such nests are constructed in lakes of considerable depth, with steep shores, where suitable bottom in shallow water can not be found, and the Bass resort to this expedient for the purpose of bringing the eggs within the proper distance of the surface. "Homo," of Philadelphia, thus writes to "Forest and Stream:"

"While in Grand Rapids, Mich., during my late vacation, I was informed by Dr. Parker, of the State Fish Commission, and a Mr. Hill, of that city, of a new feature in the habits of the Black Bass during spawning time, which had come under the notice of those gentlemen. It was that of the nest building of these fish within two or three feet of the surface in ten and fifteen feet of water. Mr. Hill told me he had frequently observed, at the head of some lakes and ponds in Michigan, a collection of ring moss and other vegetable matter, placed with apparent design on the top of brush heaps which rested on the bottom of the lake and extended nearly to the surface of the water. Not knowing what they were, he made a critical examination and found them always guarded by the Bass which had constructed the nest in the same manner in which they protect their ordinary nests made in the bed of the stream or pond. In many cases the nests would be three or four feet in diameter and larger than the top of the brush pile on which they rested. This habit of the Bass I have never heard of before, and both Mr. Hill and Dr. Parker confessed they had never seen an account of it published. It may be some of your correspondents know of it and can give further light on the subject. May it not be that some peculiar character of the bed of these bodies of water, where the nests are found, renders it impossible for the spawn of the fish which inhabit them to properly develop if deposited there, and the nest building is resorted to to aid in a better or more speedy hatching of the eggs? Perhaps more sunlight is wanted. I am at a loss to give a better explanation of the matter."

Food and Growth.

Professor S. A. Forbes, of the Illinois State Laboratory of Natural History, has been engaged, for a number of years, in the study of the food of fishes and birds. His examinations have been of the most careful and painstaking character. The following results have been attained in reference to the food of the Black Bass species.*

Of the large-mouthed Black Bass he examined the food of fourteen adults and seventeen young of different ages. The first group, consisting of five specimens under one inch in length, taken in June, July, and August of different years, showed that the entire food consisted of minute crustacea, all *Entomostraca*, except in the case of a single fish, which showed seven per cent. of a very young amphipod.

Six specimens, from one and a fourth inches to one and a half inches long had eaten minute fishes (twenty-nine per cent.) and insects (forty-six per cent.), the crustacea dropping to twenty-five per cent. The fishes eaten were not large enough to determine the species. Two specimens between two and three inches long had eaten only insects. Four specimens varying from three to three and one-half inches in length had eaten nothing but insects and their larvæ. In the fourteen adults the food consisted of seven per cent. of crawfishes, a few insects, and eighty-six per cent. of small fishes.

In regard to the small-mouthed Bass, Professor Forbes says :

"I have made full notes of the food of twenty-seven speci-

* The Food of Fishes. By S. A. Forbes. <Bulletin iii, Ills. State Lab. Nat. Hist., 18, 1880.

mens—three adult and the others young. I had none of these species under an inch in length, but, judging from the general resemblance of the food of this and the preceding Bass at later ages, I do not doubt that this will also be found to feed at first on *Entomostraca*, although insect food is possibly more important to it from the beginning."

Seven small-mouthed Bass, from one to two inches in length, had eaten only five per cent. of *Entomostraca*, the remainder of the food consisting of insects and their larvæ. Ten specimens, between two and three inches long, showed, in addition to the insect food, five per cent. of fishes, and in those ranging from three to four inches in length the amount of fish food increased to fourteen per cent., the insect food dropped to seven per cent., with seventy-nine per cent. of crustacea. The three adults had eaten thirty-eight per cent. of fishes and sixty-two per cent. of crawfishes.

Some allowance should be made for the character of the different waters in which the specimens were collected, as *Entomostraca* and other minute crustacea are more abundant in still water, while the larvæ of certain insects are more plentiful under the stones of rapid streams.

In some waters, under favorable conditions of food and environment, Black Bass of exceptionable size and weight are occasionally taken. The large specimens mentioned on page 166,* I find, upon a more careful examination of the photograph, to be small-mouthed Bass without any doubt, and are extraordinary examples of that species, the usual maximum weight of which is about five pounds. Since Mr. Cheney took those fish, he records the capture of two

* Book of the Black Bass, 1881.

more of these small-mouth giants from the same waters (Long pond, or Glen lake), near Glens Falls, New York.

One of them, taken by a police officer and two comrades, was seen and weighed by Mr. Cheney, who gives its proportions as follows: weight, eight and one-quarter pounds; length, from end of snout, to fork of tail-fin, twenty-two and one-half inches: girth, eighteen and one-half inches. Mr. Fred Mather saw this fish and pronounced it a small-mouthed Bass.

The other and larger fish was captured in the same waters by a Mr. Boynton, and is probably the largest small-mouthed Bass of which there is any positive evidence. Mr. Cheney weighed and measured it and gives its weight as eight pounds and ten ounces, its extreme length as twenty-five inches, and its girth eighteen and three-fourths inches.

Mr. H. W. Ross, when in Florida, caught, in a "clear, deep, lily-bound lake," near Altoona, in that state, a large-mouthed Black Bass which, he states, weighed twenty-three and one-eighth pounds, and measured, from tip of nose to tip of tail, thirty-seven and one-half inches, and in girth, twenty-nine and one-half inches. The head of this fish was sent to the office of "Forest and Stream," in New York, and its dimensions were given by the editor as follows: "Its maxillary bone measures four and three-fourths inches; the head is seven and one-half inches from the tip of the upper jaw to the end of the opercle, and the lower jaw projects one inch. The greatest girth of the head is sixteen and one-half inches."

Since the publication of "The Book of the Black Bass," I have killed, with the fly, the large-mouth Bass of Florida up to fourteen pounds, and have seen larger ones taken

with bait and trolling spoon, one weighing fully twenty pounds.

Hibernation.

That both species of Black Bass hibernate in the northerly parts of the country, is a fact too well known to admit of a doubt. But, notwithstanding the evidence heretofore adduced in support of this fact, the occasional catching of a Black Bass during the winter season, in the North and West, is sometimes heralded by correspondents of the angling journals as a proof that former observers have been mistaken, and that these fishes, or at least the large-mouthed Bass, do not hibernate.

Perhaps the term hibernation is not well understood by these writers, which may account for their hasty and erroneous conclusions. Hibernation does not necessarily imply, as supposed by some, a state of complete torpidity or profound sleep during the entire winter. To hibernate, according to Webster, is "to pass the season of winter in close quarters, or in seclusion;" and that that is just what the Black Bass of both species do, in northern and western waters, every one who has given the subject any intelligent investigation is prepared to admit.

When the temperature falls as low as 50°, the Bass of running streams retire to the deepest holes, in the neighborhood of shelving rocks, if possible, under which they seclude themselves and remain in a listless condition. So also, in lakes or ponds, they leave their accustomed haunts, and retire to the deepest places, near bottom springs, masses of weeds, moss, etc. After a few days of warm or mild weather, especially if the temperature approaches nearly to 50°, they will venture out into water of somewhat less depth, when they may be induced to take a bait in a half-

hearted manner, while the mild weather lasts; but, on the approach of a cold snap they again retire to the deepest water. When the temperature rises above 50°—say to 55°—and does not fall below again, they leave their winter quarters for that season.

From personal observation I am pretty familiar with the habits of both species of Black Bass, at all seasons of the year, in all of the states east of the Mississippi (except the New England States), and I am convinced that, with the exception of those in the Gulf States, both species of Black Bass hibernate in a greater or less degree, according to the temperature of the waters.

CHAPTER VII.

INTELLIGENCE AND SPECIAL SENSES.

Sense of Smell.

The olfactory organ of fishes, while being well developed, has no relation whatever with the function of respiration, as in air-breathing animals. Dr. Günther says: "It is certain that fishes possess the faculty of perceiving odors, and that various scents attract or repel them." This fact is patent to all observant anglers, and has been since long before the time of honest Izaak Walton.

Sense of Sight.

As the optic nerves of fishes show an extraordinary development, we must naturally conclude that they are as sharp-sighted in their element as we in ours. This, I think, no experienced fly-fisher will deny; yet it is the fashion for biologists to accord to fishes only a moderate visual capacity, as compared with land animals. But good, simple old Izaak Walton was much nearer the truth when he said: "A trout that is more sharp-sighted than any hawk you have named, and more watchful and timorous than your high-mettled merlin is bold."

"In the range of their vision and acuteness of sight," says Dr. Günther, "fishes are very inferior to the higher classes of vertebrates; yet, at the same time, it is evident that they perceive their prey or approaching danger from a considerable distance."

At a recent meeting of the Manchester Anglers' Association, in England, Dr. A. Hodgkinson gave an address on the "Optics of Angling," which is thus noticed by the "London Fishing Gazette:"

"In considering the subject of angling optics, we are met, as Dr. Hodgkinson pointed out, by the difficulty that we do not know exactly what the sight of fishes is, but we must assume it to be not much unlike our own, and we are not without grounds for the assumption. By drawings on a blackboard, Dr. Hodgkinson showed how the eyes of both men and fishes were alike in their main parts, the greatest divergence being that, whereas the optic nerve in man occupies only a small portion of the brain, in fishes it occupies pretty nearly the whole brain; and we may presume, therefore, that the sight of fishes is more sensitive.

"Dr. Hodgkinson then dealt with the phenomena of the passage of rays of light from the rare medium air to the dense medium water, and the change in direction that the incident ray undergoes; he pointed out the fact that under certain conditions an angler on the bank might be invisible to a fish in the stream, but the exultation of the gentlemen assembled was probably damped when they heard that, in order practically to discover the distance they must stand from the water in order to be invisible, they must take their height and multiply it by fourteen, which, as an unfortunate angler who was present pointed out, would require him, seeing that he is six feet high, to stand eighty-four feet from the water's edge before he could take advantage of the invisible mantle Dr. Hodgkinson had promised him. The case, however, is not quite so hopeless as this, for, as the doctor pointed out, the water in which the fly-fisher angles is not generally so smooth as a mirror, and in ripple or broken water it is impossible for fish to see the object on two legs that may be on the bank.

"In fishing for trout, wading in many streams is a necessity, and

by means of an ingeniously constructed tank Dr. Hodgkinson showed not only what the angler looked like to the fish when he waded, but how his aspect was affected by the color of the bottom of the river, and that of such cover as there might be on the bank. The rather startling announcement was made and demonstrated, that while the wader was duplicated so far as his legs were concerned, another pair appearing upside down on the actual legs, the man's body, if visible at all, was far away from the legs, and overhead, where, if we put ourselves in the position of the fishes, we should expect to see nothing but sky. No fish then ever saw a wader with his two halves united, and whether its feeble brain can ever connect together the two distinct objects —the body up in the air and the legs down in the water—is extremely doubtful.

"The tank by which Dr. Hodgkinson was enabled to demonstrate his theories was made so that from one end the observer could, by directing his vision from various depths of water, always look through a slip of glass placed at right angles to the point toward which he looked. In this way, and by use of a little figure to represent a man, the point where invisibility begins (four degrees) could be clearly seen, as well as the effect which the water has of apparently lifting the object much above the position which it occupies."

Sense of Hearing.

It is the rule among physiologists to say, that while fishes can hear sounds produced in the water, they are incapable of hearing those produced in the air, and even to limit their capacity for hearing accurately those produced in the water. Take this, for example, from Mr. Hugh Owen, in "Land and Water:"

"It is exceedingly doubtful if fish possess the faculty of hear-

ing, in the ordinary sense of the term. Mr. Buckland has accurately described the nature of the sensation they do possess, as vibration. There can not be a doubt that fish have no possible conception of either vicinity, direction, or distance of the vibratory disturbances they receive. A distant vibration disturbs a shoal of fishes as much as a near one; and fish feeding eagerly at the bait will be alarmed and dispersed by the beat of a steam vessel a mile off. All the stories of fish coming to be fed at the sound of a bell or of a whistle are, of course, fables. Such sounds made in the air will not communicate vibrations to the fish beneath the surface of the water. They assemble only because they see a figure, and are accustomed to be fed upon such occasions."

No angler or fisherman of experience and observation can be made to believe such specious and questionable statements as the above. He knows better.

As fishes live in a denser medium than terrestrial animals, and one that more readily transmits the waves of sound, we should naturally expect to find a corresponding difference in the construction of the organ of hearing. While the internal ear of fishes differs only in degree, not in kind, from that of the higher animals, they, of course, have no external ear, nor is one necessary in so dense a medium as water; but for this reason it is the fashion to say that they can only hear vibrations communicated through the medium of the water or the shore, the "vibrations" meaning considerable "jars" or "shocks."

The ear of fishes "lies close under the roof of the skull, and is thus easily accessible to the waves of sound, which are conducted partly through the operculum (when present), and partly through the gill slits or spiracle. As we pass to the higher animals, however, the auditory organ gradually sinks further and

further inward from the surface. Thus a new method for conducting the sound waves is necessitated, and the following structures become developed, etc."—(Wiedersheim.)

"Many Teleostei [true fishes] have fontanelles in the roof of the skull, closed by skin or very thin bone only at the place where the auditory organ approaches the surface, by which means sonorous undulations must be conducted with greater ease to the ear."—(Günther.)

"In many Teleostei a most remarkable relation obtains between the organ of hearing and the air-bladder. In the most simple form, this connection is established in Percoids and the allied families, in which the two anterior horns of the air-bladder are attached to fontanelles of the occipital region of the skull."—(Günther.)

The air-bladder, in such cases, may, in a manner, perform the functions of a tympanum.

I append a few sensible remarks from an article by W. N. Lockington, in "Pacific Life:"

"It appears to be not unlikely that fish take no notice of sounds produced in the air, but it is not so easy, unless we can argue the matter from a fish's point of view, to prove they do not hear those sounds. Take the sense of sight as an illustration of that of hearing. I have often amused myself by making believe to strike a monkey that lived in a cage with a glass front. Accustomed to such demonstrations, the monkey simply took no notice. His bright eyes never even winked. Arguing, as was argued in the fish case, I might say monkeys can not see.

"All fishes have an organ of hearing; not a rudimentary organ, but one complete in its kind, and differing from ours only in its degree of development; differing, in fact, much in the same way that the brain, the heart, the intestines, the skeleton,

the skin, the limbs, or any other part of a fish differs from that of a quadruped or from our own.

"The microphone has gone far toward proving what philosophers had previously become convinced of by deductive reasoning, that there is no motion without sound, and therefore that sound is present in numberless instances not evident to our senses. For our perception of sound we are dependent upon our sense of hearing, which is adapted only to a certain range of sounds; and this range differs in human individuals, for we all know that some other persons hear sounds imperceptible to us. Still more is this true of other animals; they may hear what we can not, yet be deaf to sounds audible to us.

"Strict experiments upon the hearing of fishes have yet to be made. Most of the observations yet made are faulty, either because, first, the observer has supposed that the fish ought, if it can hear, to notice a sound he makes for the purpose; or, second, he has argued, from the standpoint of his own senses, that if a fish hears, the range of its hearing must be nearly the same as his own.

"To conclude: that fish have ears, is indisputable; that they hear some sounds produced in the water, scarcely admits of question; that they hear some sounds produced in the air, even though they may not take notice of them, is probable, but lacks (so far as I know) experimental proof; that they do not hear many sounds which we hear, or at least do not discriminate between sounds which we, with our more highly organized organs, readily distinguish, is almost certain. All of which ends in this, that fishes hear, but their senses differ in range and delicacy from ours."

CHAPTER VIII.

ON STOCKING INLAND WATERS WITH BLACK BASS.

A LAKE belonging to the South Fork Fishing and Hunting Club, of Pittsburgh, Pa., was successfully stocked with adult Black Bass in June, 1881. The transportation of the six hundred and sixty Bass from Sandusky, Ohio, to the lake, ninety miles east of Pittsburgh, was carried out very successfully under the direction of Mr. W. A. McIntosh, vice-president of the club.

The fish were placed in fifteen oak casks, three feet high, and three feet in diameter, and five galvanized iron tanks, five feet high, and three feet in diameter. The water was kept at the proper temperature by adding ice occasionally, and aërated by means of a large air-pump and fifty feet of one-inch rubber hose, at one end of which was a series of perforated tin tubes. A large tin tube also ran along above the casks, with a small dependent tube ending in a sprinkler leading to the top of each cask, into which water was poured and entered the casks in a fine spray.

The Bass weighed from three-fourths of a pound to two and one-half pounds, averaging one and a half pounds each. The females were heavy with spawn, as the season was backward. They were on the road, from Sandusky to the lake, some thirty hours, with a loss of only sixty fish, or ten per cent. The Bass have done well in the lake, as

myriads of young Bass, six or eight inches long, were perceived the following year.

Not only in our own country have new waters been successfully stocked with both species of Black Bass, but they have been transplanted to England, Scotland, Germany and the Netherlands.

"Of twelve hundred Black Bass brought from the United States by Mr. W. T. Silk, one hundred and forty were placed in the river Nene. They were from four to seven inches in length. The river has a number of small backwaters, with swift currents and gravelly bottoms, and also deep, quiet holes. Fishing will be prohibited for some years, until the fish are well established. I think the Nene and the Welland are the only rivers in England where the Bass have been put; but they are in several lakes."—(*London Fishing Gazette*, December 1, 1883.)

"Of the seven large-mouthed, and forty-five small-mouthed Bass which Mr. Eckardt, Jr., brought from America in February, 1883, the greater number died, probably in consequence of the long journey, so that this spring there remained only three of the former and ten of the latter, which I placed in two ponds, supplied with gravel beds for spawning."—(Max Von dem Borne, *Circular No.* 4, 1884, *German Fishery Association*, Berlin, June, 1884.)

The ponds of Count Von dem Borne, alluded to above, are located at Berneuchen, Germany. On June 15, 1884, he wrote:

"To-day I had the satisfaction of finding that the three large fish had spawned, and the pond actually swarms with fry. I have caught with a small net more than two thousand, and have put them into another pond which is free from other fish. I have no doubt that next spring the small-mouthed Bass will

spawn, and that the experiment will be successful."--(*Bull. U. S. Fish Com.*, iv, 1884, 219.)

In June, 1885, he says:

"My thirteen Black Bass have spawned. I have caught 11,800 of the fry, and placed them in ponds that have no other fish."

In August, 1885, he wrote:

"I am pleased to say that the fish multiplied abundantly. I had 1,200 in the fall of 1884, and have caught more than 22,000 fry this season."

Count Von dem Borne has now more Black Bass, of both species, than he can take care of, and is shipping them to other parts of Europe. In 1886, he published a small treatise, "Der Schwartzbarsch und der Forrellenbarsch" (The Black Bass and the Trout Bass), and a larger edition in 1888. He is very enthusiastic in regard to the Black Bass as a game fish and food fish.

In March, 1885, Mr. Eugene G. Blackford, of New York, sent five young Black Bass to the Zoological Garden at Amsterdam, where they arrived in excellent condition. In December, 1885, the "Journal of the Society for the Promotion of the Fresh-water Fisheries in the Netherlands," says:

"The Amsterdam Aquarium at present possesses four fine specimens of Black Bass, which grow well, and will, in all probability, reach sexual maturity."

In April, 1882, Mr. Geo. Shepard Page took a small lot of Black Bass, comprising both species, on the steamer

Spain, from New York to Liverpool. Six of the fish were supplied by Mr. Eugene G. Blackford, of New York, and twelve young and five adult fish were supplied by Professor Spencer F. Baird, U. S. Fish Commissioner. Two of the adult Bass died before reaching Liverpool. The balance were safely transported to Goldspie, Sutherland, in Scotland, and placed in a loch belonging to the Duke of Sutherland.

PART II.

TOOLS, TACKLE, AND IMPLEMENTS.

CHAPTER IX.

FISHING RODS.

It is a source of great pleasure and satisfaction to the angler of the present day to note the march of improvement in the manufacture of fine fishing tackle, and to observe the commendable enterprise manifested by the manufacturers in producing light, elegant and suitable implements of the craft. Indeed, the skill, study, ingenuity and good taste employed in this branch of the arts is scarcely excelled in any other; all of which is highly gratifying, for it would seem to imply that the love and practice of angling has taken deep root, and that fine fishing and scientific angling are in a healthy state of growth and development.

I deem it my province, in order that the Black Bass fisher may be fully informed in regard to these various improvements, to mention those that, in my judgment, are especially meritorious.

In no direction has this improvement been more pronounced than in that of fishing rods. Rods of all kinds, both bait and fly-rods, have been reduced in length from one to two feet, and with a proportional lessening of their calibers and weights.

This reduction in the weight and length of rods neces-arily implies an improvement in materials and workmanship in their construction. And this is really the case. For instance, if a fly-rod, twelve feet long and weighing ten ounces, be reduced to ten and a half feet and eight ounces,

to be used for the same kind of fishing, it follows that it must be constructed of better materials and be more carefully and skillfully made, to preserve the same (or better) qualities for casting the fly and killing the fish.

Perhaps it would be too egotistic to say that this shortening and lightening of rods in general was induced, altogether, by the introduction of the Henshall Black Bass rod, but I am assured by some of the most candid rod manufacturers, and by many anglers, that this result is in a great measure to be attributed directly to the superior excellence of this short, light, and elegant rod and to the fact that it subserves all the purposes, and promotes the pleasures of Black Bass angling in a much greater degree than the old-fashioned long and heavy rods. I am very much gratified to think that this may be the case.

The Henshall Black Bass Bait Rod.

On page 217 of "The Book of the Black Bass" are given the specifications of an ash and lancewood rod as made by Abbey & Imbrie, which, while entirely correct for a rod of maximum weight (ten ounces) for heavy fishing, are incorrect for the standard eight-ounce Henshall rod for ordinary Black Bass fishing. The mistake was my own, but was discovered too late to rectify in that book. It occurred in this way:

Mr. Imbrie applied to me for the dimensions and specifications of the Henshall rod, when I was residing at Cynthiana, Kentucky, and at a time when I had sent all of my rods to a coach-maker, in Cincinnati, to be rubbed down and varnished for the season's work. I wrote to the coach-maker to select the best-balanced eight and a quarter feet and eight ounce rod in the lot, and to send me the exact

dimensions, inclosing a sketch of a rod with the points indicated at which to make the measurements.

The artisan complied strictly with my directions, and I sent the diagram and specifications to Abbey & Imbrie, and also to Conroy & Bissett. Afterward, upon seeing the rods made from these specifications, I found that they were too heavy for ordinary Black Bass fishing, and subsequently learned that the coach-maker had selected an admirably-balanced rod of the required weight and length, but, as it was constructed mostly of red cedar, the caliber of the rod was, of course, too great for an ash and lancewood rod. The rods referred to above, however, are so nicely-balanced and well-proportioned that they feel as light as some eight-ounce rods, and, really, many anglers prefer them to those of less weight.

In the first edition of "The Book of the Black Bass," there was an error in one of the diameters of this rod (second piece, large end), which should have been $\frac{7}{16}$, instead of $\frac{7}{10}$ of an inch, as printed. This was a typographical error, and was corrected in the subsequent issue. Also, the length of each piece as given—34½ inches—includes the ferrules, which project somewhat beyond the wood.

The correct diameters and measurements of an ash and lancewood

STANDARD HENSHALL ROD,

weighing just eight ounces, and eight and one-fourth feet in length, are as follows (these diameters are of the *wood*, or more properly of the *inside* diameter of the female ferrule, where the joints are concerned):

Length of each piece (without ferrule), 33 inches.

Diameter (outside) of end of butt-cap, $\frac{3}{4}$ of an inch.

Length of grip (from extreme butt to reel-seat), 7 inches.

Greatest bulge of grip ($4\frac{1}{2}$ inches from extreme butt), 1 inch in diameter.

Length of reel-seat, 4 inches.

Diameter of reel-seat, $\frac{7}{8}$ of an inch.

Diameter of small end of butt-piece (female ferrule, inside diameter), $\frac{3}{8}$ of an inch.

Diameter of small end of second piece (female ferrule, inside diameter), $\frac{1}{4}$ of an inch.

Diameter of extreme tip, $\frac{3}{32}$ of an inch.

The above are the specifications of the original "Coming Black Bass Rod," referred to on page 214,* and which were inadvertently omitted in that connection. These measurements are strictly adhered to in every particular by Mr. Thos. H. Chubb, of Post Mills, Vermont, and Mr. Chas. F. Orvis, of Manchester, Vermont, in their ash and lancewood Henshall rods.

Some rod manufacturers depart from these specifications by making the grip of the butt several inches longer, but this only adds to the weight and length of the rod without being of any real benefit; on the contrary, it is a positive disadvantage to single-handed rods to have a grip, or handpiece, extending from nine to twelve inches below the reel-seat.

The specifications and measurements as given above are also correct for a split-bamboo rod where reel-bands are used instead of a solid metal reel-seat, and a rod thus constructed will weigh but eight ounces; but if a metal reel-

* Book of the Black Bass, 1881.

seat is preferred, with the butt-piece tapering rapidly from it (instead of a gradual taper), ferrules of $\frac{1}{64}$ of an inch less diameter may be employed, making a rod of eight ounces, or with reel-bands, of seven and one-half ounces in weight.

When the butt of the Henshall rod is constructed of any wood heavier than ash—that is, when the entire rod is made of split bamboo, lancewood, bethabara, or greenheart—the best plan, in order that the weight of the rod may not exceed eight ounces, and that its balance and action be not impaired, is to use a short "handle" of lighter wood.

I have always been partial to a butt-piece, including the "grip," being fashioned from a single piece of wood, and with reel-bands instead of a metal reel-seat; and where this is done, with an artistically-fashioned, swelling hand-piece, and with a graceful hollow taper from the reel-seat to the rod proper, it presents, to my eye, a certain adaptive beauty and fitness that I fail to see in the short, stubby handle affixed to many modern rods. However, this is best accomplished with some such light wood as ash, black walnut, or red cedar; and where heavier woods, or split-bamboo, is used for butt-pieces, the short handle of lighter material, if artistically fashioned, is perhaps the better way in order to preserve the qualities of elasticity and balance.

The handle comprises the grip, reel-seat, and from two to four inches above the reel-seat, making a handle of from thirteen to fifteen inches long, into which the butt-piece proper is inserted, the joint being closed by a tapered metal collar or winding check.

The diameter of the lower end of the butt-piece (where it joins the handle) should not exceed the diameter of the

upper, or smaller end of the butt-piece, more than one-eighth of an inch; that is, the inside diameter of the winding check must not be greater than one-half inch, where a three-eighths ferrule is used on the smaller end.

There are various ways of finishing the "grip" of the handle, which may be formed of the same wood as the handle, and smoothed and polished, presenting a very beautiful appearance. Where it is desired to obtain a firmer hold of the hand, it may be grooved with fine transverse corrugations, or be fluted longitudinally. Another method is to wrap the grip with cord, or strips of rattan; or the grip may be fashioned of hard rubber, and may be smooth, or corrugated, or fluted.

I saw, last year, in England, some fly-rods with the grip covered with various materials, as pig-skin, cork, etc.; which were very ornamental and desirable, insuring lightness and a firm grip of the hand.

Non-doweled Joint.

One of the specifications of the Henshall rod is that the joints be made flush, with short, cylindrical ferrules, instead of the old-fashioned tapered ferrule with dowel and mortise; and as so many of these rods have been sold during the past ten or twelve years, it has had a great tendency to introduce and popularize this form of joint, which is now also applied to most fly-rods to their great advantage.

It is now thirty years since I made my first rod with flush joints, having, at that time never heard of or seen a rod joint without dowels; and ever since I have been a firm believer in this improved joint. If there were wanting any proof of the practical superiority of the non-dowel joint over the dowel and mortise joint, it would be found

in the fact that so many old anglers, as Thaddeus Norris, Reuben Wood and Chas. F. Orvis, having the mechanical skill to construct their own rods, discarded the latter for the former style of joint many years ago. And, moreover, they all seem to have arrived at this determination and conclusion independently of each other. Many of the most valuable improvements and inventions have been made in like manner, each one supposing himself to be the sole inventor.

I have often thrown apart the tapered and doweled joints of the old style rods in casting with both fly and bait rods, and have had them break near the lower end of the female ferrule, in consequence of too deep a mortise at that point; but with the cylindrical, non-dowel joint I have never had either accident to occur.

The cause of the separation and throwing apart of the dowel-mortise joint I conceive to be this: the ferrule, dowel, and mortise being made tapering, the male ferrule with its dowel acts as a wedge, and the continual springing of the rod in casting tends to loosen this wedge, and to eventually separate the joint, in the same way that we extract a nail by working it from side to side. This fact can be easily demonstrated by separating the tapered dowel joint by working it back and forth in this manner, with the hands close to the ferrules. But it can not be done with the flush cylindrical ferrule joint; to separate the latter it is necessary to pull or twist it apart, for no amount of springing it back and forth will loosen it. This fact renders nugatory and superfluous all locking devices, screws, cleats, and strings, which have been proposed to secure the joint, and prevent its separation in casting.

In July, 1886, I used a split-bamboo salmon fly-rod with

non-dowel joints (made by Thos. H. Chubb), on the Restigouche river, and cast constantly with it for ten days, on an average of eight hours a day; but neither the constant casting of a long and heavy line, nor the play of a heavy fish affected the joints a particle; they were in as perfect apposition upon being taken apart at night as they were when put together in the morning.

During one of my visits to Florida I used for sea fishing a heavy Henshall ash and lancewood rod of eleven ounces, with flush joints, made by Abbey & Imbrie, and an ash and lancewood striped Bass rod of fifteen ounces, with doweled joints, by another maker. With the former I killed redfish, drum and tarpon up to forty pounds, crevallé up to thirty, bluefish as high as ten, and bonefish of five pounds—I can not say just how many, but certainly hundreds of various sizes—and that rod is just as good to-day as when I first received it. In casting heavy mullet bait, in this style of fishing, the rod never came apart, nor was there the slightest loosening of either of the joints, in casting the bait or in playing a fish.

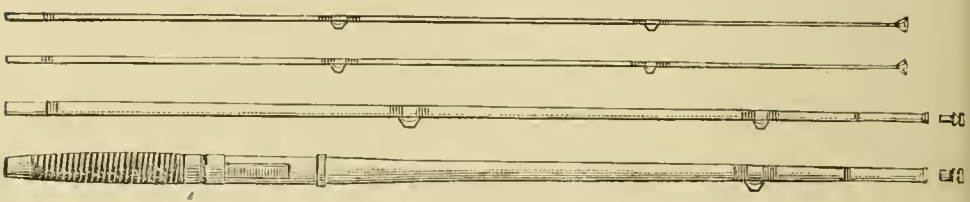
But my experience with the heavier striped Bass rod, with doweled joints, was not so pleasant, for although the joints seemed to fit perfectly, no looseness or shaking being perceptible, they separated several times in casting, and once while playing a heavy fish, and it was at last rendered *hors de combat* by breaking square off just below the ferrule of the butt-piece while casting, in consequence of being weakened by the mortise at that point. Now this was a handsome, well-finished rod, made of the best materials, and with as perfectly fitting doweled joints as I ever saw in any rod, and for which I paid a long price. I hold that the tapered dowel, in the correspondingly tapered mortise,

will become loosened in its bed, like a wedge, from continual casting, and the joint will eventually separate. My experience proves it. Viewed in this light, a perfectly fitting dowel joint, that is, where the dowel is accurately fitted to a tapered mortise, is really worse than (as is often the case) where the mortise is bored perfectly straight; in the latter case, the joint is formed by the ferrules only, for a tapered dowel in a straight hole is worse than useless.

Ferrules should be short, and perfectly cylindrical. It is not necessary for the female butt ferrule to exceed two and a half inches in length, nor two inches for the second joint. The male ferrules should be of a corresponding length, say one inch, which will give all the "hold" required. The ferrules should be perfectly fitted to each other throughout their entire extent. The lower end of the male ferrule, and the bottom of the female ferrule should be protected by metal caps or disks, soldered on, to exclude moisture. The ferrules should be fitted without cutting the wood, and a wrapping of silk put on at the ends for a finish. A good plan is to wrap on a guide or ring immediately below the female ferrules, so that the upper wrapping of the guide extends to the ferrule, which thus serves a double purpose.

Swell ferrules are unnecessary, and are neither so good nor strong as cylindrical and uniform ones. The ends of the ferrules may, however, be split, or serrated, or be swaged into a hexagonal form for split-bamboo rods, to give a more perfect fit, without any disadvantage in other ways. Ferrules may be banded if the metal is very thin, which is apt to be the case with those drawn from German silver, which can not be drawn so thick as brass. Ferrules should be affixed with shellac or cement instead of using a metal pin, which has a tendency to weaken the rod, and renders the

removal of the ferrule more difficult to the angler for the purpose of repair.



Ash and Lancewood Henshall Rod.
(Thos. H. Chubb.)

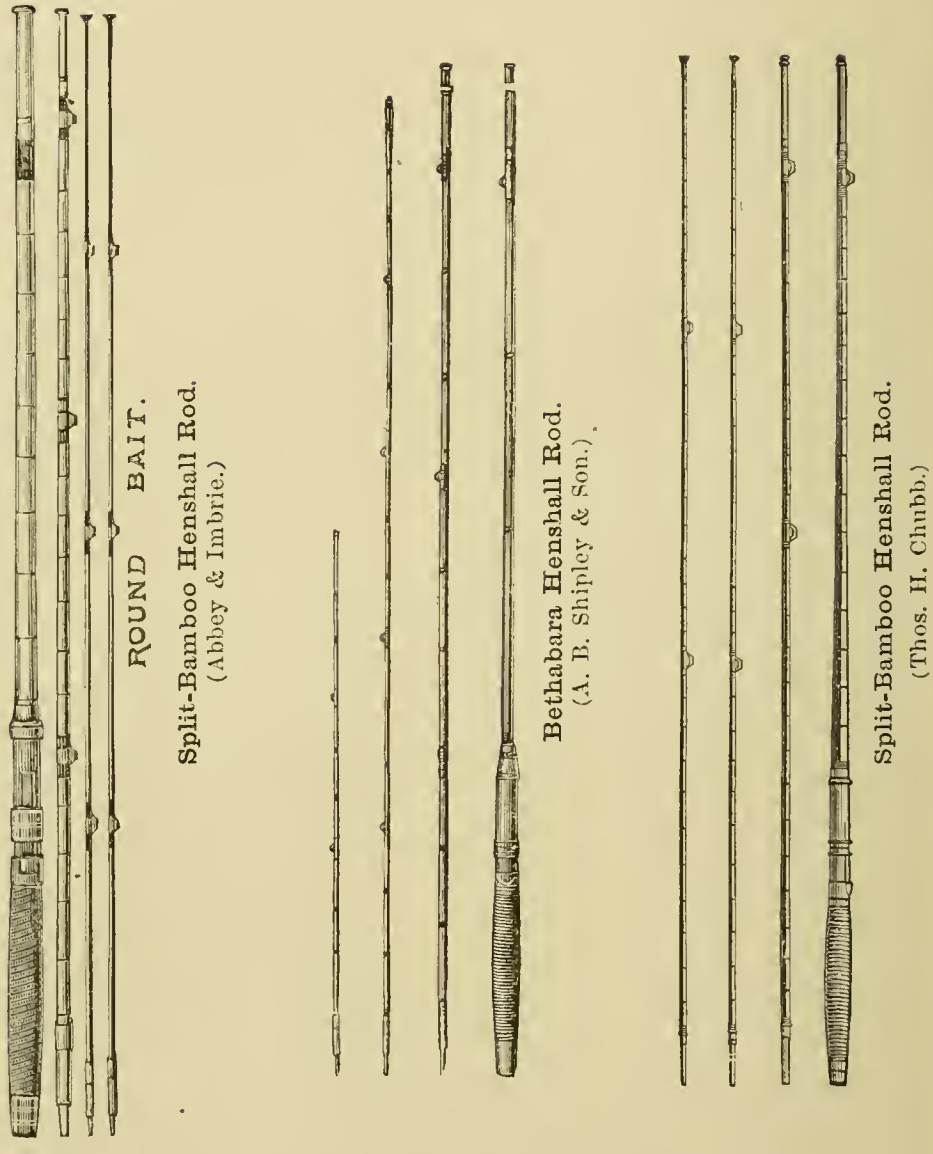
In order to show the different styles of Henshall rod, I will briefly describe several that are before me as I write. First are an ash and lancewood and a split-bamboo, made by Thos. H. Chubb. Both are made exactly according to the specifications given on page 72, with butt-piece tapering gradually from the reel-seat, and with three-eighths and one-quarter inch cylindrical ferrules. The grip in both is wound with cane strips and silk, and both have reel bands instead of metal reel-seats. They are serviceable, handsome rods, weighing each just eight ounces, with an action that is just right. Mr. Chubb writes me: "We try to have the 'Henshall rods' as near to your specifications as possible, and this we know is what makes them take so well. We sell a great many, and they all seem to give the best satisfaction."

The next is an all-lancewood with short, fluted handle of black walnut, made by Chas. F. Orvis. It is likewise made strictly in accordance with the specifications already noted. The fluted black walnut handle is in pretty contrast to the yellow lancewood and the mountings, while the flutings prevent the rod from slipping or turning in the hand, and less grip is required to hold the rod. Mr. Orvis's work is so well known in connection with the Henshall rod, that fur-

ther notice here is not needed. This rod weighs just eight ounces, and has the correct style and sizes of ferrules, while its finish is in keeping with all of Mr. Orvis's careful work.

Next is a split-bamboo, by A. G. Spalding & Bros., 241 Broadway, New York, with German silver ferrules of the the correct sizes and pattern, and metal reel-seat. It is a handsome, well-made rod, nicely balanced, and with a fine action. It has a very ornamental butt-piece and handle; the latter, above the reel-seat and below the grip, being formed of alternate strips of bamboo and red cedar; the cedar being painted black and polished is in fine contrast to the light colored bamboo. The butt, however, below the reel-seat, is several inches too long, which adds unnecessarily to the weight and length of an otherwise perfect Henshall rod.

An all-bethabara, by A. B. Shipley & Son, of Philadelphia, with a hard rubber grip, fluted spirally, and with solid German silver ferrules and mountings, including a metal reel-seat, and with agate-lined tips, is an exquisite rod, both in construction and action. It has the prescribed ferrules in size and form, and is wrapped with silk in the manner of a split-bamboo. After an experience of several seasons, I find that bethabara is very tough and elastic, with a rebound or resiliency found in no other rod but a first-class split-bamboo, or in one of steel. This quality is of the utmost importance; for a rod is thereby always rendered straight, not being so likely to become permanently set or curved from a continual strain. Bethabara makes a very quick, lively rod, and the only possible objection that can be raised against it is its weight—being heavier even than greenheart. However, I find that many anglers are willing



The above are all three-piece rods, but are shown with extra tips.

to put up with an ounce or two of extra weight on account of its other desirable qualities.

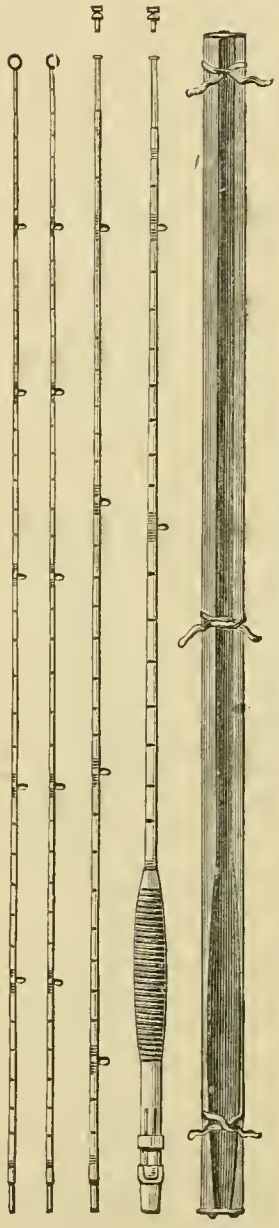
A rod composed entirely of lancewood, made by Abbey & Imbrie, has a handle, including grip and reel-seat, constructed of hard rubber, the grip being corrugated to insure a firm hold of the hand. This is an excellent rod, with German silver mountings, and the only fault, to my mind, is a grip of unnecessary length that adds somewhat to the weight and length of the rod. I am aware that many anglers prefer a long grip, extending a foot or more below the reel-seat, but this is essentially wrong in a single-handed rod, as the Henshall rod is intended to be. In a rod that is held in both hands a long grip is entirely proper.

And last, and least (in weight, but in nothing else), comes a split-bamboo, made by Mr. H. L. Leonard, for Wm. Mills & Son, and which he styles "Dr. Henshall's Favorite."

This rod is made according to the table of specifications before given, except that the ferrules are $\frac{1}{64}$ of an inch less in diameter, and the grip is just six inches long. The handle is made of spruce, with a plain grooved reel-seat and reel-bands, and is wound above and below with rattan strips and silk thread. The mountings are all of German silver, and the metal tips are lined with agate. This rod weighs hardly seven ounces, and is the most powerful one for its inches and ounces that I ever handled. It is a work of art in its construction, and a marvel of ingenuity and skill in its action.

The list of rods given above makes a handsome and, to an angler, a delightful exhibition of skill and good taste, and shows what remarkable progress has been made in this branch of industry of late years by our rod makers, who, now

Split-Bamboo Fly Rod—Fluted Handle.
(Chas. F. Orvis.)



Split-Bamboo Fly Rod.
(Thos. H. Chubb.)

Bethabara Fly Rod.
(A. B. Shipley & Son.)

The above are all three-piece rods, but are shown with extra tips.

as ever, lead the world. The anglers of America, and of Europe, are under a lasting debt of gratitude to our skilled rod makers, for their efforts in this direction. In order to become convinced of the justice of these remarks, it is only necessary for the veterans of the gentle art to take a retrospective glance, and compare the rods of a quarter of a century ago with those now turned out by our best makers.

Black Bass Fly Rods.

There are anglers, of course, who will always prefer bait-fishing for Black Bass; and, moreover, with the present short, light, and graceful "Henshall rods," rapid-running reels, lines of small caliber, and approved hooks, bait-fishing is indeed a pleasure; and the highest branch of it, minnow-casting, is the baccalaureate degree of angling, next only in degree to fly-fishing, which is the M. A. (Master of Angling) of the gentle art.

The tool of first importance for fly-fishing is the fly-rod, and fly-rods have been much shortened during the past few years. The fly-casting tournaments of the National Rod and Reel Association have demonstrated that the long and comparatively heavy rods of a decade ago were a mistake, as better work has been done with shorter and lighter rods. I have experimented a good deal in this direction during the past five years, and am now convinced that for Black Bass fishing, the fly-rod, if constructed of the best materials, and made in a first-class manner, should not be less than ten, nor more than ten and a half feet in length, and should weigh from seven to eight ounces (with reel bands instead of a metal reel-seat).

To be more explicit, a rod weighing seven and one-half ounces, and measuring ten and a quarter feet in length, is

the correct tool for ordinary Black Bass fly-fishing; for it must be borne in mind that it is not the largest Bass that rise to the fly, and a lighter rod can, consequently, be used than in bait fishing; though where the Bass run exceptionably large, and especially for the waters of Florida, a foot in length and an ounce in weight may be added.

The rod should have a stiffer back than trout fly-rods of the same weight and length, but should still retain nearly the same pliancy, though necessarily most of the flexibility will be in the upper two-thirds of the rod. This gives pliancy for casting, resiliency for striking, and plenty of "backbone" for playing and landing the fish. Of course, a trout rod of about these dimensions will answer very well for Black Bass fishing, but as the flies to be used are generally larger than trout flies, and as the Bass is usually a much heavier fish than the brook-trout, the rod will require a little more backbone than is usually found in trout rods.

To obtain the necessary spring, snap, and stiffish back required in a Black Bass fly-rod, much consideration must be given to the material of which it is to be constructed. In my opinion, there is no material that combines so many good and essential qualities as split bamboo, if of the best quality, and if it is made up in a first-class manner. It is strong, flexible, comparatively light, and is the most resilient material used in rod-making, approaching steel more nearly in this quality than any other wood. Ash and lancewood, greenheart, bethabara, and some other woods, when carefully selected, make excellent rods, but the best are inferior to a *good* split-bamboo rod. On the other hand, a first-class bethabara, or ash and lancewood fly-rod, is better than many split-bamboo rods as now made.

Mr. Thomas H. Chubb makes a rod from the specifica-

tions as given above, which he styles in his catalogue the "Henshall Black Bass Fly Rod." I have used two of these rods during the past season, and they are certainly the best rods for Black Bass fly-fishing, taking every thing into consideration, that I have ever used. They are short enough to be handy; have spring and life and pliancy for casting and retrieving a long line with ease; and have backbone and strength for killing quickly.

These are three-piece rods, and are made in split-bamboo and in lancewood. They have the short, cylindrical ferrule and non-dowel joint; have reel-bands and plain grooved reel-seat—the short handle being made of willow or spruce, with the grip wound with cane; and the mountings are German silver.

The Henshall Black Bass Fly-Rod.

The specifications for the above-described rod, in lancewood, and weighing $7\frac{1}{2}$ ounces, are as follows:

Total length of rod, 10 feet, 3 inches.

Length of each piece, without ferrule, 41 inches.

Length of handle, from extreme butt to top of winding check, 12 inches.

Length of reel-seat, 5 inches.

Diameter of reel-seat, $\frac{3}{4}$ of an inch.

Length of grip, 7 inches.

Diameter of greatest bulge of grip, $\frac{15}{16}$ of an inch.

Diameter of butt-piece at handle-joint, $\frac{15}{32}$ of an inch.

Diameter (inside), female ferrule, butt-piece, $\frac{3}{8}$ of an inch.

Diameter (inside), female ferrule, second piece, $\frac{15}{64}$ of an inch.

Diameter, extreme tip, $\frac{5}{64}$ of an inch.

It will be observed that while the ferrules used in this rod are the same as those in a short-handled Henshall minnow-casting rod of split-bamboo, the greater length of the several pieces in the fly-rod gives it greater pliancy.

Steel Fishing Rods.

Anglers have been wont to say of good rods that they were as pliable and strong as steel, or were steel-like in action, little thinking that a real rod of steel would ever be made. But there has recently been introduced a steel fishing rod by the Horton Manufacturing Company, of Bristol, Connecticut, which is really an article of much merit.

Such a thing as a steel rod has been talked of as one of the possibilities, but I never imagined how it could be successfully accomplished. I knew that a solid steel rod would be far too heavy, and I could not understand how a steel tube could be made with "play" enough to answer the requirements of a fishing rod.

The difficulty has been solved, however, in the Horton steel rod, which is composed of three tapering steel tubes, telescoping one within the other. Each tube is formed of a thin strip of steel, bent around a mandrel, the edges in close apposition, but not brazed; and therein lies the whole secret, for, being practically a slit tube, it admits of a twisting as well as a bending motion, thus simulating the action of a wooden rod; the twisting motion could not be obtained in a brazed or drawn tube. The tubes are exceedingly well tempered, which I imagine is one of the most important features of their construction.

The rod has a wooden handle, like an ordinary rod, with a small opening just above the reel-seat, through which the line passes, running through the inside of the rod and out

at the end of the tip. I have tried one of these rods, ten feet long, and weighing eleven ounces, and find that there is no more friction of the line (if as much) in running through the inside of the rod, than in running through rings or guides. The caliber of the rod is about the same as one of split-bamboo of similar length and weight, and its action is not very different in casting the fly or a minnow. Further than this I can not say, as I have not tried it in actual fishing. I will say this much, however: I believe it to be a good thing, and a valuable invention, and, though not equal to a first-class split-bamboo or wooden rod, it is fully as good, if not better, than many rods that are sold for more money, and it is virtually indestructible.

It can be, of course, improved, and I understand that the company will introduce a lighter rod next season, weighing eight ounces or less.

CHAPTER X.

FISHING REELS.

NEXT to a good rod there is nothing that contributes to the pleasure of the angler so much as a well-made reliable reel, and I am happy to be able to state that the improvements in fishing reels for Black Bass fishing have fully kept pace with the improvements in fishing rods. Manufacturers and inventors have taxed their ingenuity in devising the best and most suitable reels for both fly-fishing and bait-fishing, and the American reel, as the American rod, is to-day the best in the world.

But the enterprise of some makers has been directed in wrong channels; for instance, we now have multiplying reels made with both a "drag" and a "click," which combination might be termed a "mechanical tautology," and is the perverted outgrowth of what was originally a valid and useful arrangement.

The manufacture of the now famous Kentucky reel was first begun some forty years ago. They were, and are still, made with a drag and an "alarm," both being operated by flat, sliding buttons. The use of the drag is obvious in such a free-running reel. The alarm consists of a piece of thin watch spring bent back upon itself somewhat in the form of an elongated "U," one end being attached to the sliding block, the other end free, to engage in the small steel pinion on the end of the shaft of the spool.

This reel was originally made for bait-fishing only, and

the "alarm" was not intended in any sense to represent, or subserve the functions of a "click" proper, the spring not being stiff enough to retard the action of the reel. It was invented to meet the requirements of still-fishing, where the butt of the cane rod was frequently stuck in the bank (often by a spike provided for that purpose), thus relieving the lazy angler from the necessity of holding the rod or watching his float while waiting for a "bite," until the singing of the "alarm" announced that welcome contingency.

Now a "click" proper is a very different affair from the "alarm" of the Kentucky reel. The former is a pawl engaging, constantly and permanently, with the shaft pinion, and operated by a strong spring, so as to materially retard the action of the reel, and is used only in reels intended for fly-fishing. Originally all such reels were the single-action "click reels," but now many multiplying reels are made to subserve the same purpose by an "adjustable click," that is, a click which can be readily thrown in or out of gear. This is a very good arrangement, and all expensive multiplying reels should be constructed in this way, so as to admit of their being used for either bait-fishing or fly-fishing. In this case the adjustable click answers also all the purposes of a "drag," rendering the latter superfluous.

And now for the reason why the click and drag exist in combination in some reels. Of late years, the popularity and excellence of the "Kentucky" multiplying reel induced certain manufacturers to imitate it. This would be all well enough if they produced an exact imitation; but, not realizing the proper function of the "alarm," they substituted for it the well-known "click," and also retained the "drag,"

so as to conform to the outward appearance and ostensible construction of the Kentucky reel. Of course, this combination reel was made to "sell."

I have always advised those ordering the Kentucky reel either to have the alarm spring made stiff enough to act as a click, and to discard the drag; or to discard the alarm altogether, and have the drag spring made light enough to subserve the purposes of fly-fishing. I like the latter plan the best.

A very much needed reform has been introduced in regard to the sizes of reel-plates, or cross bars. Heretofore, reel-plates were made of any and all sizes; or, in case where a manufacturer made both rods and reels, he fashioned the reel-plate to fit the reel-seat on his own particular rods, without reference to the reel-seats of rods of other makers. Consequently, anglers have suffered very much in the past through the non-fitting of reel-plates to reel-seats. This evil became so aggravated that the National Rod and Reel Association took cognizance of the matter, and after conferring with the manufacturers as to the expediency and desirability of adopting a uniformity in the sizes of reel-plates and reel-seats, it was finally resolved, at a meeting of the said society, that the standard size of reel-plates for Black Bass and trout reels should be two and a half inches long, one-half inch wide, with a curve made upon a circle of an inch in diameter, and with a thickness at the ends of the plate of one-fiftieth of an inch. Most of our manufacturers conform to this rule, and it is earnestly hoped that all will eventually do so.

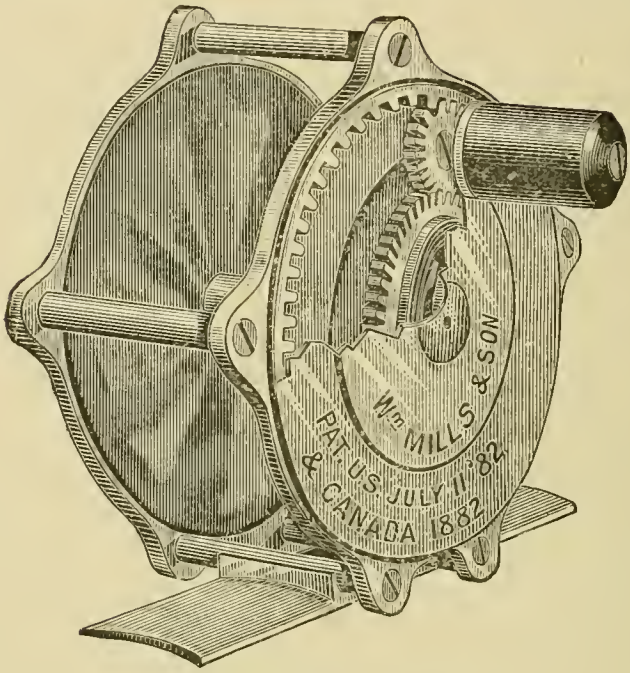
The best reel-seat is the old shallow groove cut in the wood, with reel-bands. It is lighter than any other reel fastening, and subserves its purpose as well as any of the

modern inventions. Any reel can be made to fit it in a few moments. If it is too shallow for the cross-bar of a reel, it is only necessary to deepen it with a gouge chisel or a penknife. If the reel fits too loosely, a piece of paper or cardboard, placed under the cross-bar, tightens it. With solid metal reel-seats there is no remedy but by altering the cross-bar of the reel, which sometimes entails a good deal of labor and no little skill; and it may have to be altered a second or a third time to fit the metal reel-seats of other rods.

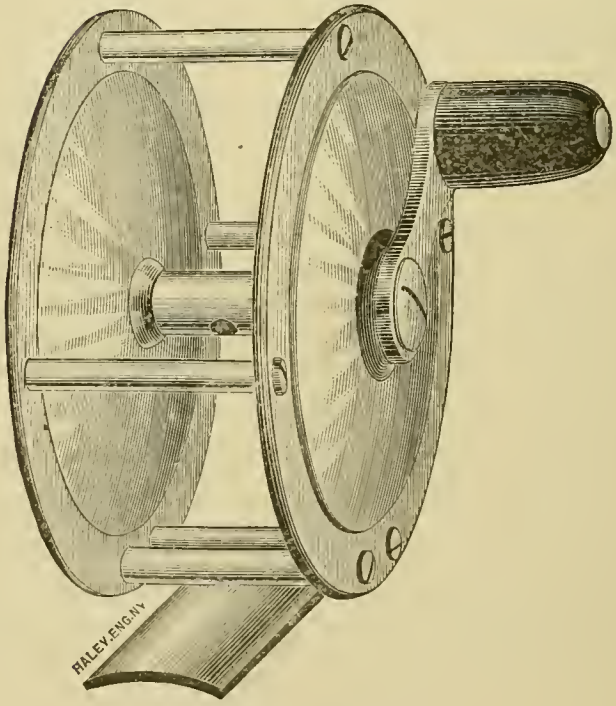
The solid metal reel-seat subserves no important purpose, and adds one or two ounces to the weight of the rod. It is idle to say that the additional weight gives the rod a better balance—it should balance without it; or that the wood may swell (without it) and cause the reel to stick—if the groove is well varnished and the rod properly used it will not swell. The fact is, the metal reel-seat is put on to make the rod "sell." If rod makers will not conform to the standard size of reel-seats, as now adopted, then let them go back to the old grooved, wooden reel-seat.

Click Reels.

Among the improved click reels is one patented by Mr. Thomas H. Chubb, which, in addition to having an improved and reliable "click," is of a new and novel form. The end plates, instead of being the usual flat disks, are struck up so as to be convex on the outside, with a flat and narrow rim, or edge. The inner side, or concavity of the end plates, being opposed to the concavity of the spool plates, allows an elliptical space between them, in which the spring and pawl of the click are arranged in an improved manner, and



Treble Multiplying Reel.
(Wm. Mills & Son.)



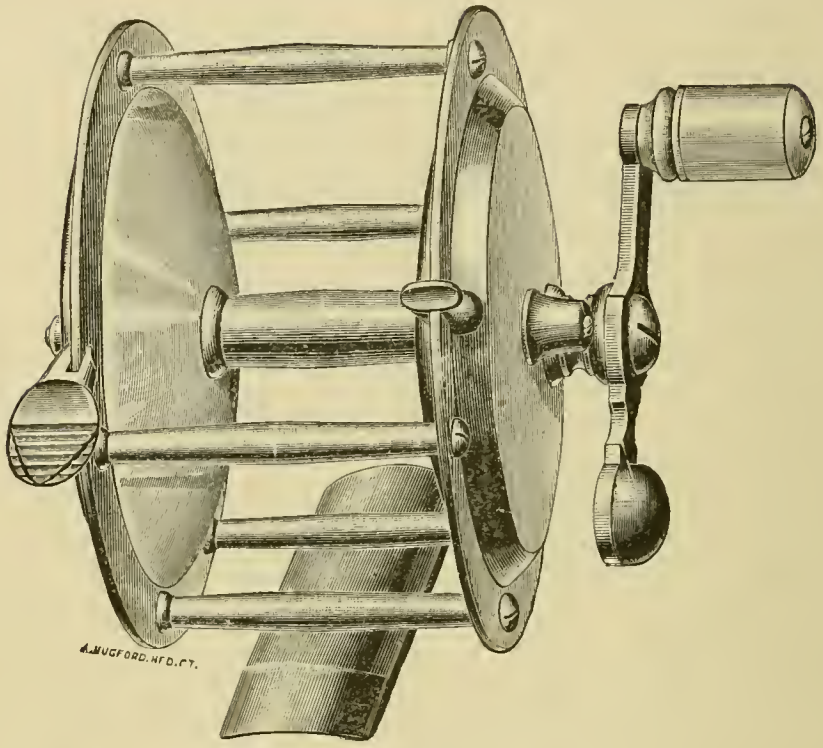
New Style Click Reel.
(Thos. H. Chubb.)

are thus entirely protected. The reel is perfectly symmetrical in form, and very strongly, though neatly and lightly made, of German silver.

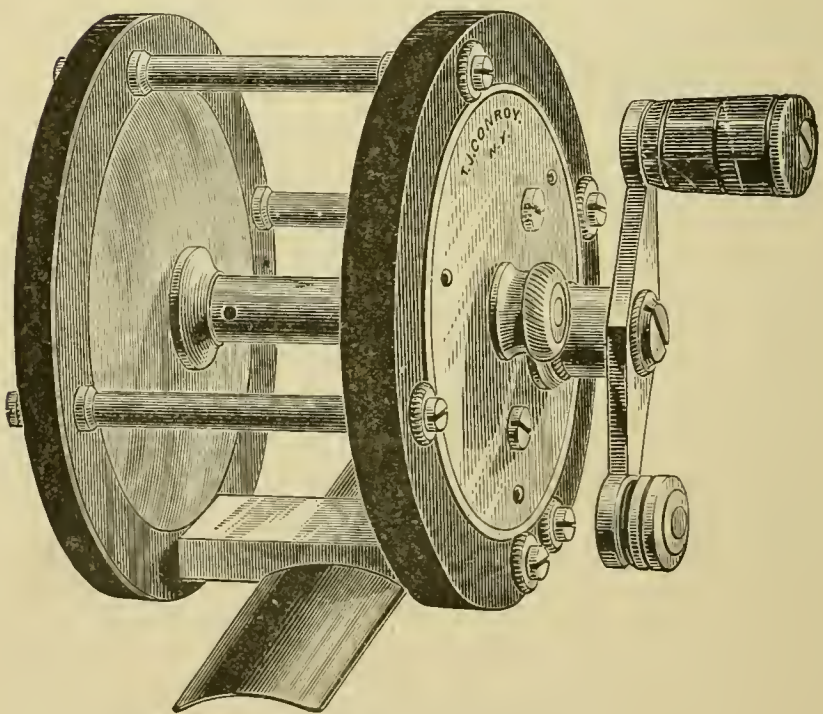
Wm. Mills & Son manufacture a very novel combined click and multiplying reel, which is eminently well adapted for fly-fishing. A reference to the illustration will show that its peculiar mechanism consists in an application of the principle of the epicycloidal wheel. The invention consists of a fixed ring, with teeth on the inside, attached to the frame of the reel; a spur wheel upon the shaft of the spool; and a pinion engaging with said toothed ring and wheel. The pinion is riveted to the outside plate (which is a revolving disk) of the reel, to which is also affixed the handle. By this arrangement the gearing is all in the same plane, and the spool moves in the same direction as the handle, only three times as fast, thus making it a treble multiplying reel.

The automatic drag of this reel is also a novel feature. The central pinion is countersunk to admit a coiled watch spring with a ratchet or pawl on its free extremity, which engages with shallow cogs, or cams, on the end of the axis of the spool. As the line is pulled off the spool, it is retarded somewhat by this ratchet-wheel, the same as by a click; but in reeling up the line the ratchet and cogs are inoperative, and the line is reeled rapidly and without hindrance.

Thus it has all the advantages of a single click reel, with a protected handle, to which is added its value as a triple multiplier. It is constructed entirely of metal, and is a very light and compact reel.



Henshall-VanAntwerp Reel.
(Thos. H. Chubb.)



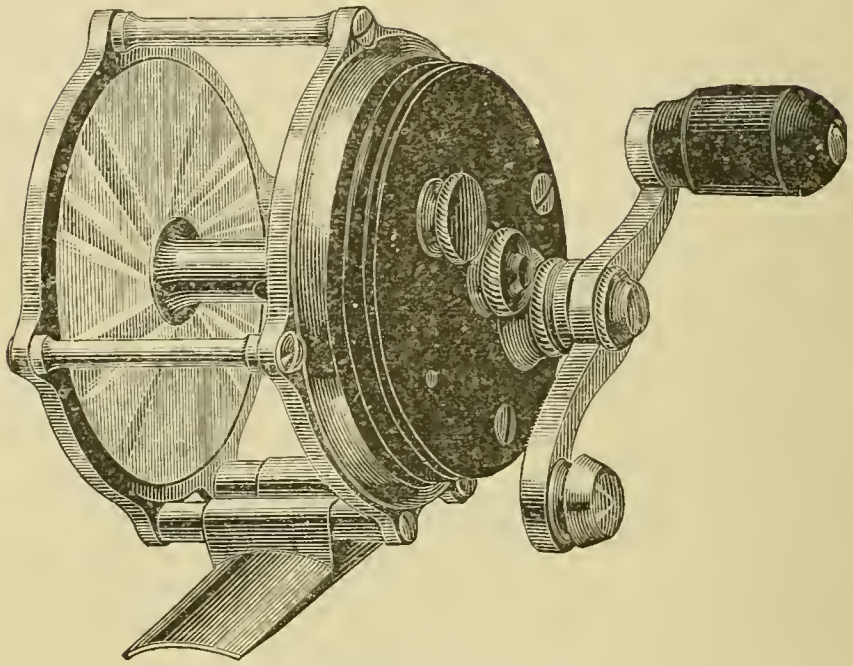
"Silver King" Multiplying Reel.
(Thos. J. Conroy.)

Multiplying Reels.

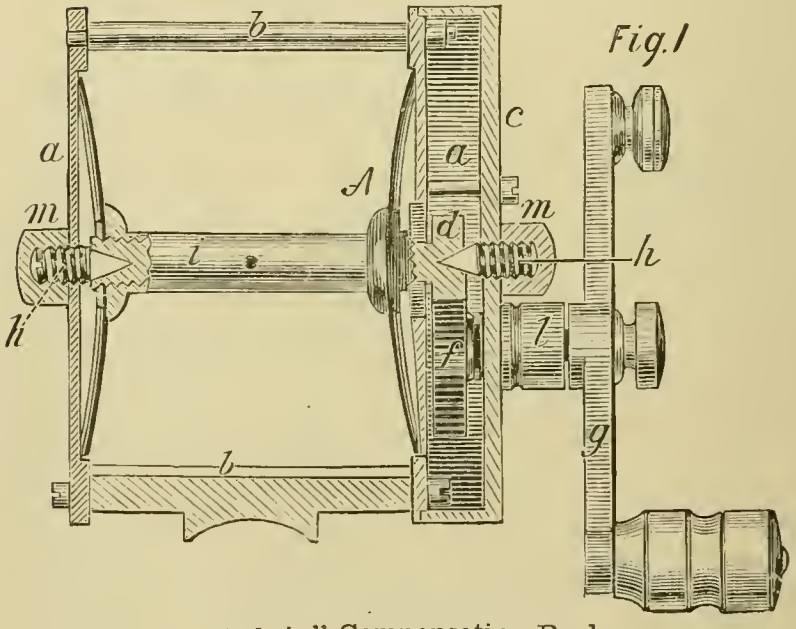
But the greatest advance, perhaps, has been made in the direction of multiplying reels for Black Bass fishing. There are now a half dozen reels in the market, from which the angler may take his choice, with the positive assurance, and with the utmost confidence, that he is sure to get one that will fully answer his purpose, however he may choose. Among so many really good ones, comparisons are indeed odious, and it is simply a matter of taste as to which is selected.

The "Henshall-Van Antwerp" reel is manufactured by Thos. H. Chubb, of Post Mills, Vermont. The reel was designed by Dr. Wm. Van Antwerp, of Mt. Sterling, Kentucky (one of the Fish Commissioners of that state) and myself. It is a perfectly symmetrical reel, the end plates being struck up so as to form, with the spool plates, a concavity at each end, in one of which is placed the gearing, and the adjustable click and automatic drag in the other.

The automatic drag was designed to meet the requirements of those anglers who can not educate the thumb to control the rendering of the line in casting the minnow. For my own use I prefer, as does any expert, a very rapid multiplier without click or drag of any kind, in bait fishing; but there are good anglers who can not, for some reason, successfully acquire the knack of thumbing the spool in a satisfactory manner, and the line will overrun and snarl, and the spool backlash in spite of their most patient and persistent efforts. To meet this difficulty the automatic drag acts in the place of the thumb, as the amount of pressure brought to bear upon the spool can be regulated, automatically, by a sliding button on the side of the reel, and



"Imperial" Black Bass Reel.
(Wm. Mills & Son.)



"Imbrie" Compensating Reel.
(Abbey & Imbrie.)

overrunning or backlashing be prevented; or the pressure on the spool can be regulated by the lever-drag, or thumb-piece, which operates the same spring as the sliding button just mentioned. With this thumb-piece any amount of tension can be brought to bear upon the spool, when casting, or the line stopped, simply by the pressure of the thumb; or when a fish is hooked the tension can likewise be regulated by the thumb-piece from a free-running spool to a light drag, heavy drag, or a complete stop. On the rim of the end plate is an adjustable click, to be used only in fly-fishing. It will hereafter be placed on the same side of the reel as the automatic drag. Either the click or the drag can be operated while the reel is in motion.

The bearings of the shaft are compensating, by which it can be properly adjusted, or any wear taken up. This compensating principle I know to be a good one, as it is the same as applied to reels about forty years ago by Mr. Snyder, a watchmaker of Paris, Kentucky, and a contemrorary of Mr. Meek, of Frankfort, Kentucky. The reels of both of these makers were built upon the same plan, but Mr. Snyder constructed his spool-shaft with conical ends, fitting into screw-pivots with beveled recesses. I examined one of Snyder's reels, a year or two ago, that had been in constant use for more than thirty years, which, by virtue of the compensating device, ran as smoothly as when first made.

Mr. Chubb's reel is made of the best quality of German silver, and has steel gears and steel pivots throughout. The wheels and pinions are cut with oblique teeth or cogs, which gives greater power in reeling and more freedom in casting than the ordinary straight cogs. The reel is made

in two styles, to multiply two or four times, at the choice of the purchaser.

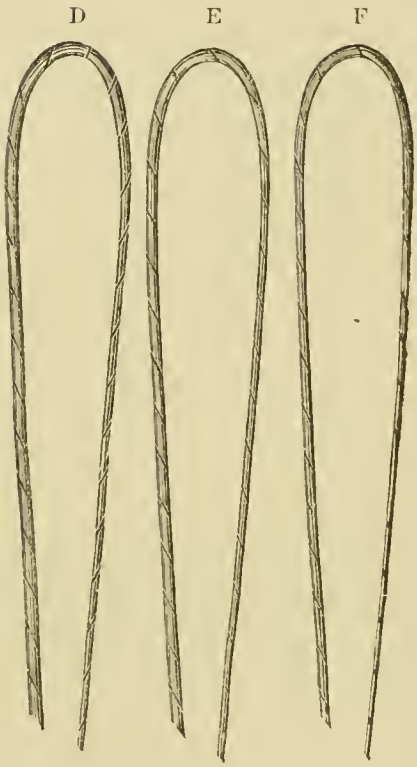
Thos. J. Conroy, 65 Fulton St., New York, makes several styles of multiplying reels for Black Bass fishing, the best being his "Silver King." This is an excellent reel, with symmetrical end plates of hard rubber, and German silver cap, spool, and handle. It has full steel pivots, balance handle, screw-off caps for oiling, and a patent adjustable sliding click on the back plate, that can be operated while the reel is in motion (and with the rod hand if necessary), and is as well adapted for fly-fishing as bait-fishing, being quite light. It is a double multiplier, and a very handsome, substantial reel; and being fitted accurately in all its parts, works remarkably smooth and rapid, and is made in a first-class manner throughout.

Abbey & Imbrie's patent "Imbrie" compensating, steel-pivot reel, is one of the greatest merit. It is a double multiplier, well and substantially made in hard rubber and German silver, with an adjustable click, answering equally well for fly-fishing or bait-fishing. The compensating device is a very desirable feature, causing the spool to revolve as swiftly and noiselessly as though running on jewels, and as the bearings become worn, they can be adjusted and compensated by the device mentioned. This consists of beveled recesses in the ends of the shaft, or axis of the spool, into which are fitted the conical ends of screw-pivots (just the reverse of the "Snyder" method, mentioned above, but subserving the same purposes), which are tapped through the center of each outside plate, or disk. The heads of these pivot-screws are covered by caps in the usual manner, by removing which the pivots can be screwed in or out, adjusting their conical points perfectly to the coni-

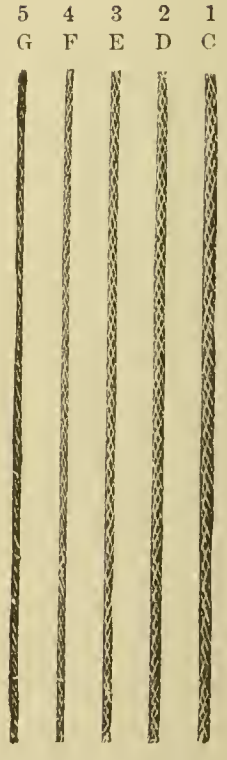
cal recesses of the shaft. By this compensating device the reel can be made to run smoothly always, thus avoiding the wabbling, unsteady, and noisy working of the spool in ordinary reels after they become worn, and renders this portion of the reel "practically everlasting."

Wm. Mills & Son's new "Imperial" Black Bass reel is another very meritorious candidate for the favorable consideration of the angler. It is a double multiplier, with steel pivots and screw-off caps for oiling; has a strong frame of German silver, with raised pillars, and end plates of hard rubber. By the raised pillars the capacity of the spool is much increased without adding to the size or weight of the reel. It has an improved adjustable click on the back plate (the cut wrongly shows it on the crank plate), allowing it to be operated while the reel is in motion, and is as well adapted for the fly-rod as for minnow-casting.

A novel feature in connection with this reel is a simple device for throwing the handle in and out of gear, so that in casting the minnow the spool revolves entirely independent of the handle and gearing, thus doing away with considerable friction and allowing the bait to be cast with greater ease and delicacy. The device for this purpose is operated by a short, arrow-shaped lever which occupies the position on the crank plate that is wrongly appropriated by the click button in the illustration on page 96.



Tapered Enameled Fly Lines.
(Wm Mills & Son.)



Braided Silk Lines.
(Wm. Mills & Son.)

CHAPTER XI.

FISHING LINES.

While the tapered, enameled silk line is all that can be desired for fly-fishing, the lines heretofore furnished for bait-fishing were open to several objections. On page 258 of "The Book of the Black Bass," I made the statement that the perfect line for Black Bass bait-fishing was yet in the future, and suggested how a much better line than any in use could be made, and expressed the hope that such a line would soon be produced, as I had invited the attention of the extensive fishing line manufacturing concern of the Henry Hall Company to the matter.

I am happy to be able to state that suitable lines were shortly afterward manufactured by the said company, in response to those suggestions, and have been in the market for several years. These lines seem to be all that can be wished for as reel lines in bait-fishing, and the Bass fisher has much to congratulate himself for.

Reel Lines for Bait-fishing.

The Henry Hall Company's lines, just alluded to, are styled letter "H," or No. 6 in size; and while they are a third less in caliber than the "G," or No. 5 line, they seem to contain the same amount of stock, and to be fully as strong, but being more closely braided they are much smaller in size, and more compact. They absorb but little

water, and consequently render very freely in casting the minnow.

These lines are made in several styles, and of the best selected dressed and raw silk. The dressed or boiled silk line is very firm and light, weighing not quite two grains to the yard—one hundred yards weighing one hundred and eighty-five grains. It is of the same caliber as the No. 1 sea-grass line, and fully as strong, sustaining a strain of eight pounds. It is of a pinkish-drab or light chocolate color.

The raw silk line is very hard and compact, and a trifle heavier than the boiled silk line, weighing about two and one-third grains to the yard, or two hundred and thirty-five grains to a hundred yards. It is mottled in color, usually white and green, like most raw silk lines. It sustains a dead weight of ten pounds, which is at least three times the strength actually required with a pliant rod. I have often killed Bass averaging three pounds with a line that would not sustain more than a pound, dead weight.

The Henry Hall Company also makes this line waterproof by a new process, which does not detract in any way from its use as a bait line, as the waterproofing does not diminish its flexibility or softness in any degree—a result that had before been impossible to obtain, as all waterproof lines were too stiff and unyielding for minnow-casting.

The process of waterproofing, however, makes the line perfectly black in color, which at first sight might be deemed an objection by some. But I have experimented with this line by numerous practical tests, alternating with lines of lighter tints, and have never discovered that it made the slightest difference to the Bass themselves. And if we will reflect a moment, and hark back to our youthful experience

in angling, when we fished for fingerling trout, shiners, gudgeons, or sunfish, with black sewing silk for lines, or in our adolescent days, when we made our own lines for Black Bass fishing, by twisting together two or three strands of sewing silk—we somehow always preferred black silk; and we were just as successful in luring the wily Bass with those somber, home-made lines, as we were after the braided, light-tinted lines came into vogue.

The Hall Company also makes a cable-laid line of boiled silk—No. 1, or about the same size as the "H" line—which is the best twisted line I ever saw for bait-fishing, on account of its non-liability to kink, as compared to other twisted lines; indeed, for still fishing it will answer every purpose, and even where a moderate amount of casting is done. The one advantage of a twisted line is that it absorbs but little water, for it twists all the harder for being wet, and thus causes kinking; but when cable-laid this detestable contingency is obviated to a considerable extent.

Reel Lines for Fly-fishing.

There has been no improvement in the *best* enameled, waterproof line for fly-fishing, as it has been about perfect for a number of years. However, some manufacturers whose work in this class of lines was formerly not very satisfactory, have lately shown a commendable spirit by turning out much better lines.

Recently, when in England, I examined the best English fly-lines, but there was nothing that could compare to those of American manufacture. London dealers showed me, with much pride, the metal-center line, which they claimed to be the best fly line in the world; but A. G. Spalding & Bros. sent me a metal-center, enameled silk line that is

far ahead of the best produced in England, and the equal of any enameled line made in the United States.

The advantage of a metal-center line is that it can be used of a smaller caliber and still retain the same weight as a larger line; and at the same time it is probably a little stronger, though for that matter any of the enameled lines are strong enough.

The metal center consists of an extremely small copper wire, around which the line is braided. The wire is so fine that it does not stiffen the line to an appreciable degree, as might be imagined. As the line is so thoroughly waterproof, there is not much probability of the wire becoming oxidized or rusted.

CHAPTER XII.

SILK-WORM GUT.

It has long been known that from the larvæ of several species of our native silk-worm moths, much longer strands of gut, for leaders, can be produced, than from the Chinese silk-worm; but, while strands of satisfactory lengths have been frequently taken, there seems to be a want of some special knowledge, or a lack of some peculiar skill in the proper treatment or manipulation of the larvæ, or the silk-glands, or in the drawing out of the fluid silk, in order to produce the silken strands of the desired strength.

Among those who have been interested in the matter is Mr. Chas. F. Orvis, of Manchester, Vermont, who, having procured a number of cocoons of the two species of native silk-worms, known as *Platysamia cecropia* and *Telea polyphemus*, hatched and raised the larvæ very successfully. In an article (*Forest and Stream*, 1886, December 16) giving a history of his experience, Mr. Orvis says:

"We drew many strands from both varieties, each worm giving two strands, *i. e.*, one from each sac. Before drawing, we put the worms in a dilute solution of acetic acid, or of weak vinegar, which seems to render it more tenacious. After leaving them for a few hours, they were taken out and drawn to their greatest length, as related in regard to the Chinese worm. The length was all that could be desired, for we obtained from the *cecropia* strands over three yards (nine feet) long, and from the

polyphemus strands nearly as long; and the color was perfection, *i. e.*, delicately tinted either green or pale brown, according to the variety. But alas, our hopes were vain; for the next day, when they had dried, we found that they had but little strength compared with the product of the Chinese worm. It could hardly have been in the drawing, for we had previously drawn gut from the Chinese worm, proceeding in the same manner, and it was hard and strong. We drew many strands, but all with no better success."

It will be observed that Mr. Orvis placed the larvæ, before drawing, a "few hours" in "weak vinegar," while Dr. Garlick (page 272, "Book of the Black Bass"), who claimed to have produced strands equal in strength to Spanish gut, drew the worm without any kind of preparation.

The practice in China and Spain is to soak the worm in vinegar of full strength for from two to twelve (accounts vary) hours, according to temperature, the time required being less in hot weather than in cool; and, as Mr. Orvis states that he had previously drawn gut from the Chinese worm, "hard and strong," by the same treatment that he applied to the American worm, it would seem that either the foreign method is not well understood, or that the American silk-worm requires a different mode of treatment in this respect, or, according to Dr. Garlick, no treatment at all.

It is hoped that experiments in this direction will continue to be made, until the native gut can be produced fully as strong as the best Spanish gut. If it can be done there is a fortune in it for somebody, for a leader in a single piece of from six to nine feet in length, and as strong as the Spanish gut, will bring a good price.

An easy way to experiment in the matter would be to

collect the fully grown larvæ just before they are ready to spin their cocoons, as they are quite plentiful in the central portions of the United States, especially in button bush or water-sycamore swamps. In order to enable any one to identify the moths and their larvæ, the following good descriptions are abridged from C. H. Fernald ("Standard Natural History," S. E. Cassino & Co., Boston, 1884, vol. ii, pp. 456–457):

The Cecropia silk-worm, *Platysamia cecropia*, which has a wide distribution in the United States is one of our largest moths, expanding six inches or more. It has a most remarkable appetite, feeding on no less than fifty different species of plants, among which are the apple, plum, maple, elm, oak, beech, birch, willow, etc. The female lays from two to three hundred eggs, which are creamy-white and striped with reddish, and hatch in eight or ten days. The young caterpillars are black, and change in color and size at each moult until mature, when they are three or four inches long, and of a pale green, or bluish-green color. The tubercles on the third and fourth segments are coral red; the others on the back are yellow, except those on the second and last segments, which, with those along the sides, are blue; and all are more or less armed with black bristles. They construct elongated, coarse, dull brown cocoons. The wings of the moth are of a rich brown color, sprinkled with gray scales, with a large kidney-shaped spot, shaded more or less with red, and margined with black, near the middle of each wing. A red band, edged on the inside with white, crosses the wings near the middle. The outer edges of the wings are pale silky brown, through which runs an irregular black line on the fore wings, and a double broken band on the hind ones. The base of the fore wings is dull red, with

a curved white and black line, and near their apex is a black eye-spot with a bluish crescent in it, and a shade of lilac above.

The American silk-worm, *Telea polyphemus*, is our best native silk-producing species. Each female lays from two to three hundred eggs, which are about one-sixteenth of an inch in diameter, slightly convex on the top and bottom, the convex portions whitish, and the nearly cylindrical sides brown. These hatch in from ten to twelve days. The caterpillar feeds on the leaves of oak, elm, etc., and when full-grown is over three inches long, of a light-green color, with seven oblique yellow lines on each side, and the tubercles on the segments orange with a silvery spot on the middle. The last segment is bordered by a purplish-brown V-shaped mark. It spins a whitish oval cocoon, which often falls to the ground, where the insect remains during the winter in the pupa state.

Those especially interested are referred to the articles of Mr. Trouvelot (*American Naturalist*, 1867), for his experience and experiments in obtaining the silk, and in rearing the American silk-worms.

Leaders.

Anglers, now as ever, are continually theorizing and speculating as to the most suitable colors for leaders, in order to render them as little discernible to the fish as possible. Many experiments to this end have been made by using aquaria, or glass tanks especially constructed, or by the experimenter putting his head beneath the surface of the water, in order to view the leader through the same medium as the fish.

But the praiseworthy experiments to determine the color

of leaders least visible to the fish, however commendable, are sure to end in disappointment; such, at least, has been my experience. Experiments to this end have been made by practical anglers for many years with no other result than to show that the finer the gut the better, without reference to color. My own experiments in this direction have not been few, and I have demonstrated, to my own satisfaction at least, that any color of leader or snell will answer equally well, from hyaline to black, though I confess that I was formerly partial to a slight bluish stain, or mist color, and perhaps without any well-defined reason, except that it *ought* to be least visible to the fish.

But when we enter the province of speculation and conjecture, and try to see for the fish, or, in other words, to measure their visual capacity by our own, we are doomed to disappointment, though we bring to our aid all the known resources of the science of optics. I lately read, somewhere, that an English angler declared that the salmon took the fly under the delusion that it was a shrimp, because while said angler was beneath the surface of the water, the artificial flies on the surface appeared to him like shrimps. To have made some show of proving his statement he should have first demonstrated that salmon could be taken with shrimp bait as successfully, and in the same situations, as with the fly.

The only way to experiment with profit, in this direction, is to experiment with the fish themselves, otherwise our efforts will be like the play of Hamlet with the melancholy Dane left out. The sense of sight in fishes is but little understood, as is, indeed, the anatomy of their visual organs, which fact precludes all analogous reasoning from our own standpoint, alone. I have satisfied myself, however, that

they see as well in their own element, perhaps better, than we in ours.

That the color of the leader is not important is very evident when we reflect that the boy with line of wrapping cord, red, white, or blue, or the angler with line of twisted strands of black sewing-silk, to which the hook is affixed without leader or snell, is as successful in taking trout or Black Bass with bait, as others with lines of the most approved colors. Sharks do not hesitate to take the bait even with the huge hook and chain and swivel accompaniment, nor do codfish, and other marine fishes, refuse the bait because of the large hooks, wire snells, or coarse white lines; yet it is to be presumed that their discernment is as acute as that of a brook-trout.

As to leaders and snells in fly-fishing, I do not think it makes any difference, practically, as to their color. The greatest desideratum, it seems to me, is to have them as fine as possible, consistent with the strength required, and this is not much with a flexible rod, for the amount of strain exerted by a fish on the rod and tackle is very much less than is popularly supposed. Though any color may answer, I prefer lines and leaders of neutral tints as being more in accordance with the eternal fitness of things, than for any other good reason, provided the staining does not weaken the gut; and as this may possibly be the case, and as the stain or dye certainly can not *add* to its strength, it is best, I think, to use leaders and snells of unstained gut. I have used, with success, snells and leaders of the finest silver suture wire, for trout and Black Bass, but, practically, they are not pliable enough, and are too heavy.

On the whole, then, I think we shall have to be content with our leaders and snells as we find them to-day, simply

selecting those that are the finest, roundest, and most perfect, remembering, meanwhile, that a sight of the angler himself is more fatal to successful fishing than a display of the coarsest leader, or of the most *outré* in color.

Leaders are now mostly made with loops for attaching the dropper flies, and is by far the most preferable way. An excellent mode of making the loop is as follows:—and if the reader will refer to Fig. 11, on page 278, and its explanation on page 281 ("The Book of the Black Bass"), the matter will be made much clearer—In forming the usual knot for tying the gut lengths together in making a leader, the two ends are lapped about two inches in forming that knot; but to make the loop, lap about four inches, and double one strand back on itself, so that there will be then three strands (instead of two), presented for tying, each about two inches long—two of the strands forming the loop; now tie the knot in the manner as shown in the illustration referred to, and draw tight. This will leave two short ends on one side of the knot, and a loop on the other; the former are to be clipped off short. This loop should point toward the reel end of the leader, or away from the stretcher fly, in order that the drop fly when attached may stand at a right angle to the leader, and thus prevent it becoming curled around it, when wet.

A very good plan of making leaders is that used by some anglers, who tie the gut strands together in lengths of three feet, with loops at each end. Two of these lengths can be looped together for a six-foot leader, or three for one of nine feet. The flies can also be attached to these looped ends very easily. In this way a number of casts can be prepared, which may be used as found necessary. If the angler is using, say, a leader of six feet made in this way,

with the stretcher and dropper flies attached to the end loops of the lower three-feet length, it will readily be seen how easy it would be to change the cast by simply "unlooping" the leader in the middle, and looping on another three-feet length—with flies already attached—as before. It will also be seen how easily a leader can be repaired in the same manner, by discarding the broken or frayed portion and replacing it with another three-feet length.

In testing the strength of leaders for Black Bass fishing, the angler should be very careful not to apply a force or weight of more than two or three pounds, which is really more than it will require in actual fishing, and is all the strain a leader can be put to without injury. Silk-worm gut is always weakened when tested to the breaking point, or one of six or more pounds; thus, a leader that breaks at eight pounds at the first trial, will not be likely to sustain more than six pounds at the next, and still less at the third trial. But if a low test is applied, as suggested, a good leader will last until worn out, in actual fishing. There is really no necessity for testing a first-class leader, for Black Bass or trout fishing, when bought from a reputable maker.

Snells, or Snoods.

Most Black Bass flies are now made with a short loop, or eye, of double gut, instead of being tied on snells of several inches in length. This is much the best way. They can be as easily looped on for stretchers, and by using separate snells looped at each end, they can be as readily attached for droppers. These separate snells should not be more than three or four inches long; and when the

fly is tied directly to the snell, the latter should not exceed four inches in length—three inches is really long enough. Short snells or droppers will stand out better from the leader than longer ones, and they fit the modern fly-books much better.

The "eye" or loop of the fly may be formed of the smallest sized wire gimp, instead of gut, as it is stronger, and can not become chafed or frayed. It will, however, increase the weight of the fly somewhat; but this will be no disadvantage in fly-fishing for Black Bass.

CHAPTER XIII.

HOOKS.

Recently the old "eyed" hook has been revived in England for artificial flies, but with this difference: the old-fashioned form had the eye either turned up, or vertical, that is, on the same plane with the shank, while the improved eye is turned down; though some prefer it turned up, the turned down eye is deemed the best form. Through this eye the snell is passed and fastened by one of several knots or hitches, each of which has its advocates.

But the Black Bass fisher need not worry his brain as to whether the eye should be turned up or down, nor fret his soul as to the particular knot or hitch by which to attach the snell; for the plan of making the eye of gut or gimp in Bass flies is really to be preferred to any form of eyed hook, as the loop of the snell can be readily passed through the small gut loop at the head of the fly, and over the latter, and then drawn tight, making a very neat and secure attachment—neater and more secure than by any form of eyed hook with knotted snell; but the eye of the new hook is so small that, except in large sizes, a doubled gut can not be passed through it, consequently it must be fastened by a single gut with some sort of knot. It is best suited for the very small hooks, on which the trout flies of England are usually tied, and for the very finely drawn, or gossamer gut, of which the snells are made.

What with eyed hooks, brazed or unbrazed, turned up or

down; May flies, dry flies and floating flies; snaps, flights, gangs, traces and gags; spinners, propellers, link-swivels, brake-winches and metal center gimp; registered seat, lock-fast joints, beware of imitations, etc.; it would seem that the boasted conservatism of the average Englishman weakens as soon as he takes to angling. I saw last year in England more "novelties," and revivals of old and obsolete ideas, in new dresses, for the angler and fly-fisher, than were ever dreamed of in my American angling philosophy.

During my visit, the British angling mind was much exercised in regard to the re-numbering of fish hooks, started by an interested angler who had "invented" and patented or "registered" a new form of hook (with the turned down eye), and who wanted the Redditch manufacturers to depart from a uniform system of numbering hooks that had been established for nearly a century, and adopt the Kendal system.

On this subject Mr. S. Allcock, the famous hook manufacturer, says:

"In Redditch we number from 1 to 20, the size becoming smaller the higher the number, in the same way that the wire is numbered. This is logical, for the finer the wire the more frequently must it be drawn through the plates to reduce it. The sizes larger than No. 1 we number 0, 00, 000, etc. This system has worked well for centuries.

"Now, however, a manufacturer employing a very few hands chooses to number his hooks backward, 20 being a large size and 1 a smaller size; those smaller than No. 1 he calls 0, 00, 000, etc.; and Mr. Pennell has written a book in which he adopts this numbering; but the only reason given for this new system is that 'it is sufficiently elastic, allowing of extension either way.'"

As the hooks that are most in vogue in the United States, as the Sproat, O'Shaughnessy, Carlisle, Aberdeen, Dublin-bend, and hollow-point Limerick, are all numbered according to the Redditch system, and agree very closely in all the sizes, it would be in the nature of a calamity to change it for the Kendal or any other system.

Snelling Hooks.

It has been recommended, in tying gut snells to hooks, to heat the shank of the hook and coat it with rubber or other cement, or wax, and to soften the gut by soaking, or to crimp it by biting with the teeth or pinching it with pliers; but let me caution the tyro, and advise him to do nothing of the kind. It destroys the temper of a hook to heat it, and burns off the protective coating; it breaks the fiber of the gut to bite or crimp it; and when the gut is expanded by soaking and tied on, it shrinks upon drying, and leaves the wrapping loose.

The best way to tie a gut snell to a hook is to use nothing but well-waxed silk thread, and to wrap *evenly and tightly.* If properly done it will *never* pull off. Rubber cement loses its life after a time, becoming brittle, and rots the silk wrapping; and so will all cements, sooner or later, from constant wetting and drying. At the best, if they do no good they may do harm, and it is folly to use them when they can better be dispensed with.

In tying a hook to gut, use the best sewing-silk—the finest for very small hooks and coarser for larger ones; use red shades as they seem to be stronger, and the color is suitable. The silk must be well-waxed, and there is nothing better for the purpose than the best *light-colored* shoemak-

er's wax, which can be folded in a piece of soft leather to prevent soiling one's fingers.

Some writers advise laying the gut on the back of the shank, but it is much better and more proper to place it on the front or inside of the shank. When it is on the back the direction of the traction and the strain is away from the end of the shank, and has a tendency to stretch or loosen the wrapping at that point; while with the gut in front of the shank this is obviated, as can be easily demonstrated, by placing the point of the hook against the ball of the thumb and making traction on the snell.

Now, then, to tie a tapered hook to gut, proceed as follows: First wax the silk well; then take the hook between the thumb and forefinger of the left hand (if you are right-handed), with the end of the shank to the right, and the barb uppermost; lay the gut along the inside of the shank for half its length, for small and medium-sized hooks, or one-third for large hooks; and lay the silk alongside of the gut, their two ends together; and begin wrapping the silk (around the gut, shank and itself) at the end of the shank, and wrap *firmly*, evenly and closely down toward the bend of the hook, using as much strain in wrapping as the silk will bear, and continue the wrapping for a short distance, or six or eight turns, below the end of the gut. Begin the wrapping just below the end of the shank, leaving its tip bare, and finish the wrapping with the invisible knot.

The invisible knot is formed in two ways: one by reversing the hook in the fingers of the left hand, so that the shank points to the left, and laying the silk along the shank with its end beyond the end of the shank, leaving a loop of the silk to continue the wrapping, around the shank, gut and silk, passing the loop over and around the bend of the hook

at each turn, until four or five turns are made, and then drawing the silk back by its end, through the turns, drawing tightly, and clipping off the end closely. It is more easily done than described.

Another way of making the invisible knot, or rather a different way of doing the same thing, is to lay a doubled thread of finer (unwaxed) silk along the wrapping, its loop being toward the bend of the hook, and include this doubled thread in the last four or five turns around the shank and gut, but not wrapping quite so firmly as before, and then pass the end of the wrapping silk through the loop, by means of which the wrapping thread is pulled back and out under these last turns, and after drawing snugly and tightly the end is to be closely clipped off. When the wrapping is completed, it is to be well coated with shellac varnish by means of a camel's hair pencil.

CHAPTER XIV.

ARTIFICIAL FLIES.

THERE are flies and flies. Nearly every angler has his favorites, both in general and special flies. Very often the preference is purely fanciful, but it is a pardonable weakness, to which we are all more or less prone; and then it can not do much harm, for I believe that, in most instances, we are more choice in the matter than the fish themselves. The facts are, that, when fish are rising freely, almost any fly will kill; but when they are shy and diffident, it is only flies of certain colors, or combinations of colors, and skillfully cast, that seem to induce a rise. Perhaps, after all, it is the manner of offering, rather than its peculiar features, that renders a particular fly more killing than others at certain times.

But that there are some flies that are more generally and uniformly killing, day in and day out, on various waters, is a fact proved by practical experience, and generally admitted by fly fishers. Among these are notably the Coachman, Grizzly King, Professor, Red Ibis and the several hackles or palmers. These were all originally trout flies, but they answer as good a purpose for the Black Bass when made of the proper size, which is nearly twice as large as the ordinary trout fly.

We really do not know, exactly, what color or combination of colors, or just what form or size, they prefer. Sometimes they will take any thing made of feathers, tinsel, silk,

or wool, or a bit of rag, and of any known color; at other times they will notice only certain colors or sizes, and at still other times they will rise to nothing in the semblance of an artificial fly. Then, again, a fly or flies that are killing on some waters are comparatively useless on others.

If we knew the "particular vanity" of the Black Bass in color or colors, or if he is color-blind, just what form or size is most tempting, we should have an easy task. Experience and observation teach us, however, that the Black Bass, like most other game fishes, seems to have a penchant for red, yellow, brown and black, and at times gray and green, and many artificial flies embody one or more of these colors in their construction, and they are usually killing flies.

Perhaps this can be better shown in the following table, where the *predominating* colors of body, wings and hackle are readily seen:

NAME OF FLY.	BODY.	WINGS.	HACKLE.
Montreal	Red.	Brown.	Red.
Polka	Red.	Gray.	Red.
King of the Water	Red.	Gray.	Red.
Abbey	Red.	Gray.	Red.
Red Ibis	Red.	Red.	Red.
Lord Baltimore	Yellow.	Black.	Black.
Oconomowoc	Yellow.	Brown.	Dun.
Queen of the Water	Yellow.	Gray.	Red.
Professor	Yellow.	Gray.	Brown.
Ferguson	Yellow.	Brown.	Green.
Oriole	Black.	Yellow.	Black.
Grizzly King	Green.	Gray.	Gray.
Seth Green	Green.	Brown.	Red.
Coachman	Herl.	White.	Brown.
Henshall	Herl.	Gray.	White.
White Miller	White.	White.	White.
Gray Drake	Gray.	Gray.	White.

The above list embraces all of the flies that I use in Black Bass fishing, except the red, black, brown, gray, and yellow hackles. The last four in the table are especially useful on dark days, or toward evening.

Most of the flies in the above table are general favorites, and in my own hands have all proved very killing. I merely mention them, to the exclusion of others, as a general guide, for each angler will soon adopt a few flies for his own fishing, none of which may have been mentioned above, but he will nevertheless continue to use them, and swear by them on all occasions; and this is one of the glorious privileges of the art of angling.

As a father naturally thinks his own children the best, smartest, and handsomest, I may be pardoned for placing in the above list—and strongly recommending as general flies—my Polka, Oriole, Oconomowoc, and Henshall, leaving to others the praise or condemnation due them. The formulæ for their construction are as follows:

Polka.—Body, scarlet, with gold twist; hackle, red; wings, black with white spots (guinea fowl); tail, brown and white, mixed.

Oriole.—Body, black, with gold tinsel; hackle, black; wings, orange or yellow; tail, black and yellow, mixed.

Oconomowoc.—Body, creamy-yellow; hackle, white and dun (hairs from deer's tail); tail, ginger; wings, cinnamon (woodcock).

Henshall.—Body, peacock herl; hackle, white hairs from deer's tail; wings, gray (dove); tail, two fibers (green) from peacock's tail-feather.

The Lord Baltimore fly originated with Prof. Alfred M. Mayer, of the Stevens Institute of Technology, Hoboken, New Jersey. Its formula is as follows:

Lord Baltimore.—Body, orange; hackle, tail and wings, black, with small upper wings of jungle-cock.

Professor Mayer and I, being natives of Baltimore, and knowing that black and yellow formed a good and taking combination in an artificial fly, each designed, unknown to the other, a fly to embody these colors; and as they are the heraldic colors of the State of Maryland, and were the heraldic colors of Lord Baltimore, Professor Mayer aptly named his trout fly, "Lord Baltimore;" while I designated my Black Bass fly, the "Oriole," from the Baltimore oriole, or hanging bird, which beautiful songster was named in honor of Lord Baltimore, as its colors were the same as his own—black and orange.

I have been experimenting with a fly, of my own designing, for several seasons, that is as yet a puzzle to me. Sometimes it is the most killing fly I ever cast, the Bass rising to it madly when they would notice no other fly; but on other occasions it is not at all successful, the Bass refusing it altogether, always taking the other fly in the cast. I have not yet determined the most suitable conditions and occasions for using it, though I am inclined to think it best on cloudy days. It is constructed entirely of metallic colors, and I give its formula in order that any one feeling an interest in it may try it:

Golden Dustman.—Body, bronze (peacock herl); hackle, golden yellow; wings, bronze (wild turkey); tail, fibers from the crest of golden pheasant.

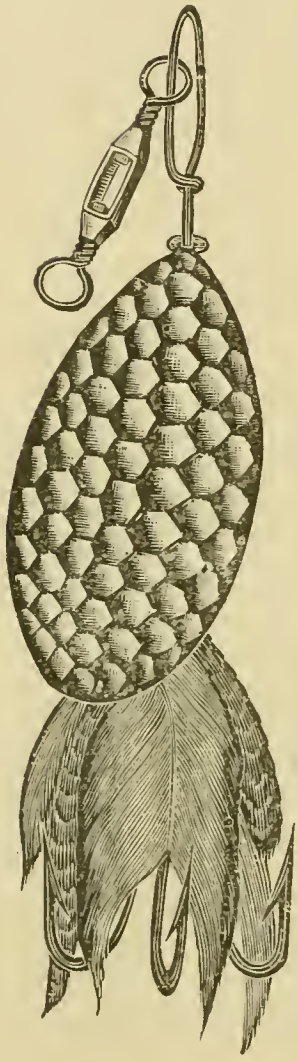
Abbey & Imbrie have patented and manufacture what they call the "Fluttering Fly." It is made in the same patterns and in the same manner as the conventional fly, except that the hook is reversed; that is, the tail of the fly is at the end of the shank, while the head is near the bend

Patent Fluttering Fly.
(Abbey & Imbrie.)

of the hook, or opposite to the point. A glance at the above illustration will explain this better than any description.

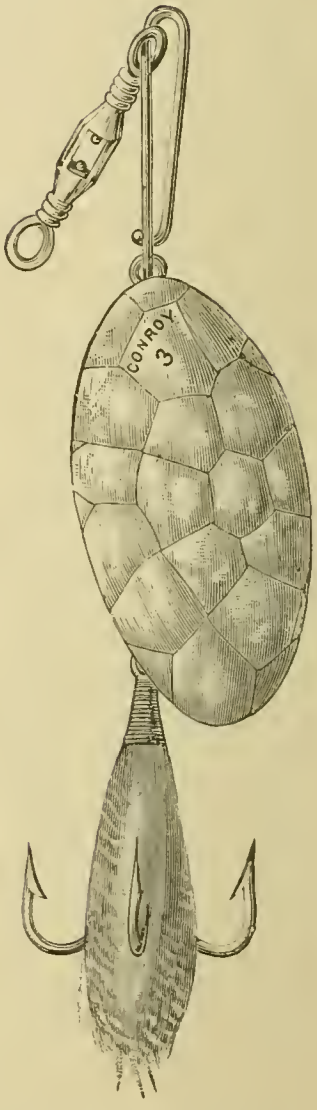
It will readily be seen that when this fly is drawn through the water, the wings and hackle, instead of closing, as in the ordinary fly, expand—which, it is claimed, gives it a fluttering, lifelike motion, similar to that of a struggling, half-drowned insect. The barb being near the head of the fly, it is further claimed, is more likely to fasten the fish, as it is almost sure to be hooked if it touches the fly.

I have used these flies, and like them very much, though I have not had experience enough with them to determine whether they are better, under any or all circumstances, than the ordinary fly. They are well worthy of a trial, and every progressive fly-fisher should add a few of his favorite flies, tied in this manner, to his fly-book.



Hammered Spoon Bait.
(Abbey & Imbrie.)

Pearl Spoon Bait.
(Wm. Mills & Son.)



Hammered Spoon Bait.
(Thos. J. Conroy.)

CHAPTER XV.

ARTIFICIAL BAITS.

Probably in no direction has there been more ingenuity displayed than in the production of artificial baits, such as trolling spoons, spinners, propellers and artificial minnows, frogs, crustacea, insects and nondescripts.

In trolling spoons the changes that have been rung upon the original oval metal spoon, with a single hook, have been, to say the least, remarkable; and it is, indeed, surprising to see the number of forms that have been evolved from that simple implement. Every conceivable shape into which the old spoon could be cut, bent or twisted, and still have it revolve, has been resorted to; and it has been fluted, hammered and corrugated; and grooved, ribbed and perforated; embossed, painted and nickel-plated; and doubled and trebled, and made to spin around floats and balls and metal minnows and flies, until the brain begins to whirl, and the eyes become dazed in their contemplation. Some are fearfully and wonderfully made, and are the most cruel and murderous-looking instruments of torture ever devised for the use of the followers of the meek and gentle Walton.

The trolling spoon has its legitimate uses, when it is properly made and judiciously employed. There are situations where the small revolving spoon with a single hook can be cast with a light rod and still remain within the pale of legitimate angling; but there is *never* any excuse for using more than a *single* hook.

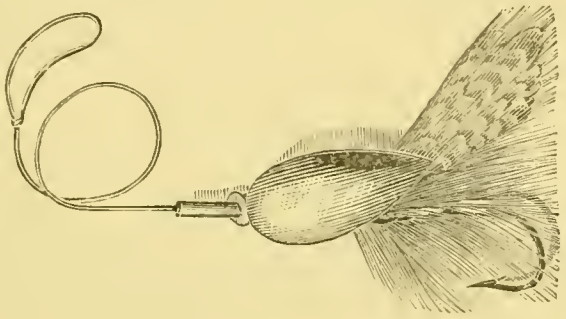
Why do manufacturers persist in affixing the triple hook, or triangle, to trolling spoons, when a single hook is so much more efficient, preferable and humane? All triangles, double hooks and gangs are English abominations invented or devised by the devil, or his children, the pot-fishers, for pike fishing. There is nothing so effective as the single hook for any kind of fishing. The fish is more certain of being hooked, more certain of being landed, and if he breaks away does not have his mouth so torn and lacerated as by the villainous triple hook or gang. I have found dead Bass with the entire premaxillary bone (upper lip and jaw) torn off by these murderous implements. I never see or hear of an angler using or recommending a gang of three or more hooks for trolling the live minnow without setting him down as a pot-fisher; and all humane and genuine anglers —those who love fair play and use light and elegant tackle, should deprecate and discourage the cruel practice.

Trolling Spoons.

One of the most effective improvements in spoon-baits is the so-called "hammered" spoon. It is simply the old oval spoon with the convex surface "hammered" or pressed into polygonal depressions and ridges, presenting numerous facets for the play and sparkle of the light and sunshine when revolving. As made by Conroy, and Abbey & Imbrie, and Spalding Brothers, they can not be surpassed; and if a single hook was attached instead of the triple hook or triangle, we could use them with a clear conscience. The Spaldings make their spoon with a lower section hammered and plain above. I have used the smallest size, No. 1, having the hammered section nickled and the plain section gilt,

with a single hook, on a fly-rod, in swift, tumbling waters, with good effect.

There is nothing in this line more beautiful than the pearl spoon; and it will always be a "spoon," for being made of shell it can never be bent or twisted into the fanciful forms of some of the metal ones. It is very effective as a lure, and the smallest sizes are well adapted for the fly-rod in broken waters.



Adjustable Fly-Spoon.
(Wm. Mills & Son.)

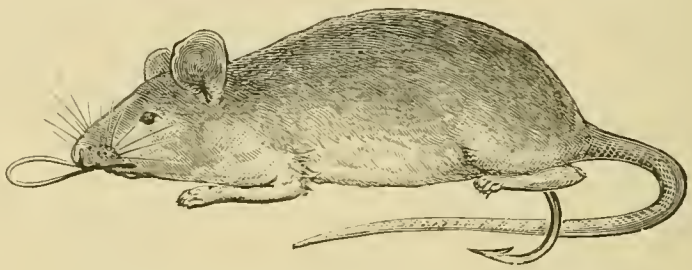
One of the neatest things in the way of a revolving bait is the adjustable fly-spoon of Wm. Mills & Son. This small spoon can be readily adjusted to a snelled hook or an artificial fly, and will be found very suitable for the white water of riffles and rapids.

Artificial Minnows.

Mr. Imbrie sent me for trial a soft and flexible artificial minnow of the style known as the "phantom," which he calls the "Capelin" phantom. After divesting it of the several triangles of hooks which are always attached to artificial minnows, and re-investing it with a single small hook, I used it with remarkably good success in the rough water under mill-dams. It is a very durable bait and is made in

a first-class manner, and when spinning in swift water presents a very life-like appearance, being bright and silvery in color.

Artificial Baits.



Improved Artificial Mouse.—Fur Body.
(Thos. J. Conroy.)

The above is a very life-like imitation of a mouse and is well calculated to deceive. It is well known that very large trout and Black Bass have been caught with a live mouse as bait, and it remains to be seen whether the imitation will be as successful.

Three years ago I was trout-fishing on Slate river, the inlet of Gogebic lake, and was returning down stream, homeward bound on account of a heavy rain. I sat in the bow of the boat casting under the banks on either hand as my boatman paddled noiselessly along. On reaching a wider portion of the stream I observed a field-mouse swimming across, and when it reached the center of the pool a fine trout rose for it, but as he did so, saw me, turned tail and disappeared. Upon my arrival at the hotel I imparted what I had seen to a friend who was very anxious to kill a large trout, and who next day repaired to the spot and succeeded in taking it; it weighed fully one and a half pounds, and was a good fish for that stream.

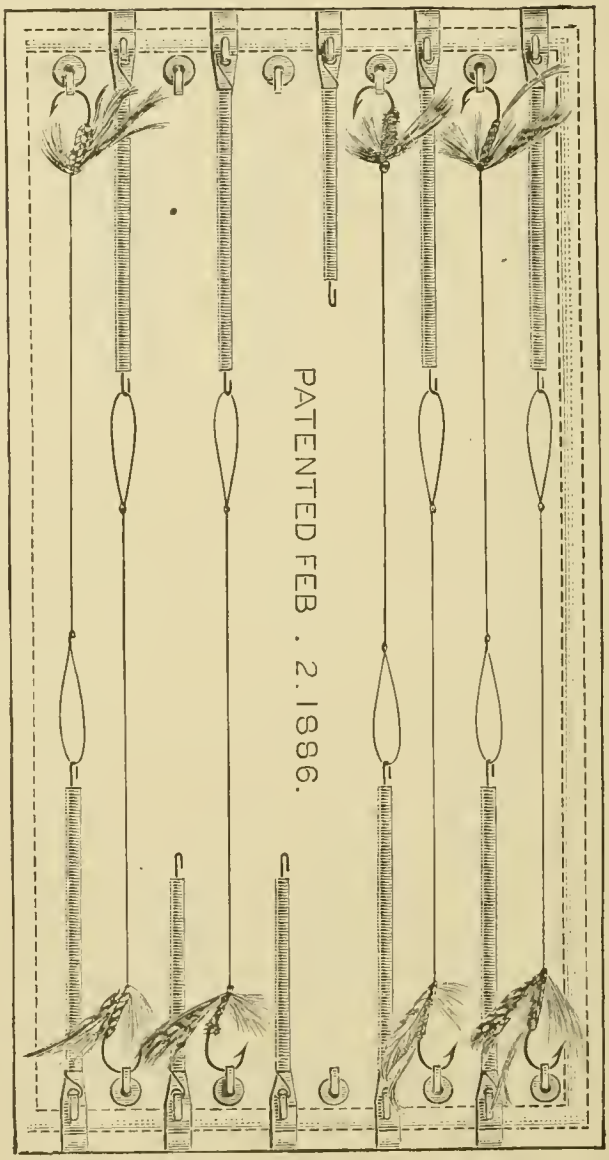
CHAPTER XVI.

NATURAL BAITS.

THERE is not much to be added to the Chapter on Natural Baits. There have been some changes in the scientific nomenclature of the cyprinoid fishes, or minnows, mentioned on page 318 of "The Book of the Black Bass," owing to a better understanding of the ichthyology of North America.

The common shiner is now known as *Notropis megalops;* the creek chub as *Semotilus atromaculatus;* and the horned, or river chub as *Hybopsis kentuckiensis.* To these may be added the steel-backed minnow, *Campostoma anomalum*, which is a very common minnow, brassy in coloration, and much mottled with dark blotches; it has thick, tough lips, almost sucker-like, and is a favorite bait on Kentucky and Ohio streams.

There are a dozen or more species of minnows used for bait, in Black Bass fishing, and which are indiscriminately called by anglers "chubs" and "shiners;" but it would only cause confusion to allude to their scientific names.



Conroy's Improved Fly-Book.
(Thos. J. Conroy, 65 Fulton St., N. Y.)

CHAPTER XVII.

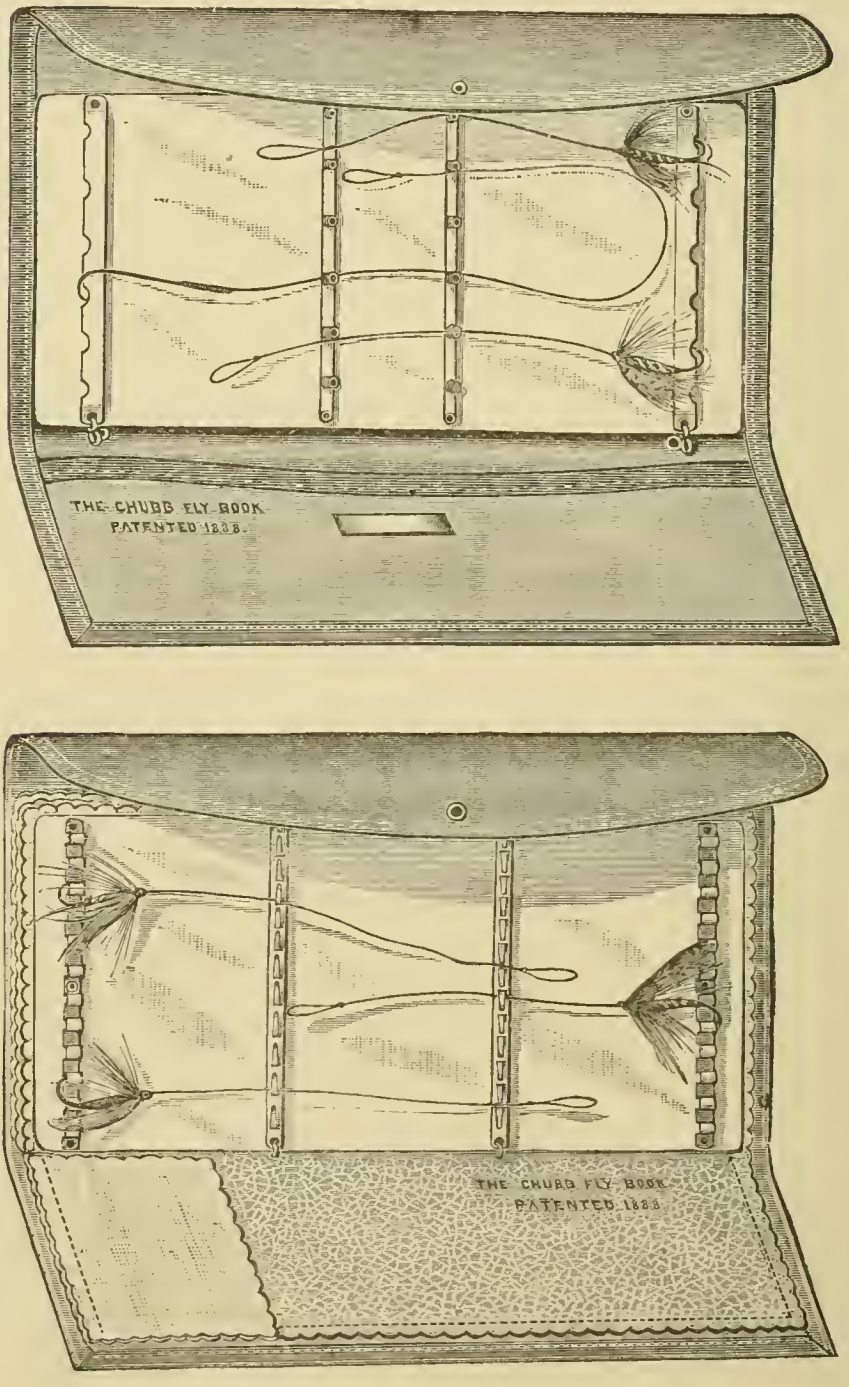
MISCELLANEOUS IMPLEMENTS.

The list of miscellaneous implements is constantly being added to, to meet the wants or requirements of anglers. It is not only interesting, but surprising, upon looking over the catalogues of our large dealers, to observe the improvements and inventions that are being made, each season, in this department. Every thing that can be devised or thought of to increase the angler's pleasure or comfort is put into practical shape.

Fly-Books.

Every manufacturer has patented at least one fly-book, and some of them, two or three; and where there is so much competition there is sure to be production of good articles. It is really hard to choose between those now made, and the choice must be left entirely to the angler's taste or fancy as to the different methods of securing the flies, and also as to details of construction and finish.

The "Bray" patent fly-book, manufactured by Spalding Brothers, is a very strong and substantial leather book. The fly-leaves are made of stiff waterproof board with metallic surfaces, at one or both ends of which is riveted a strong nickel frame, scalloped to accommodate a dozen flies. The snells are stretched and secured by means of two long and closely-coiled spiral springs, placed completely across the page, at equal distances apart, which are fastened to the

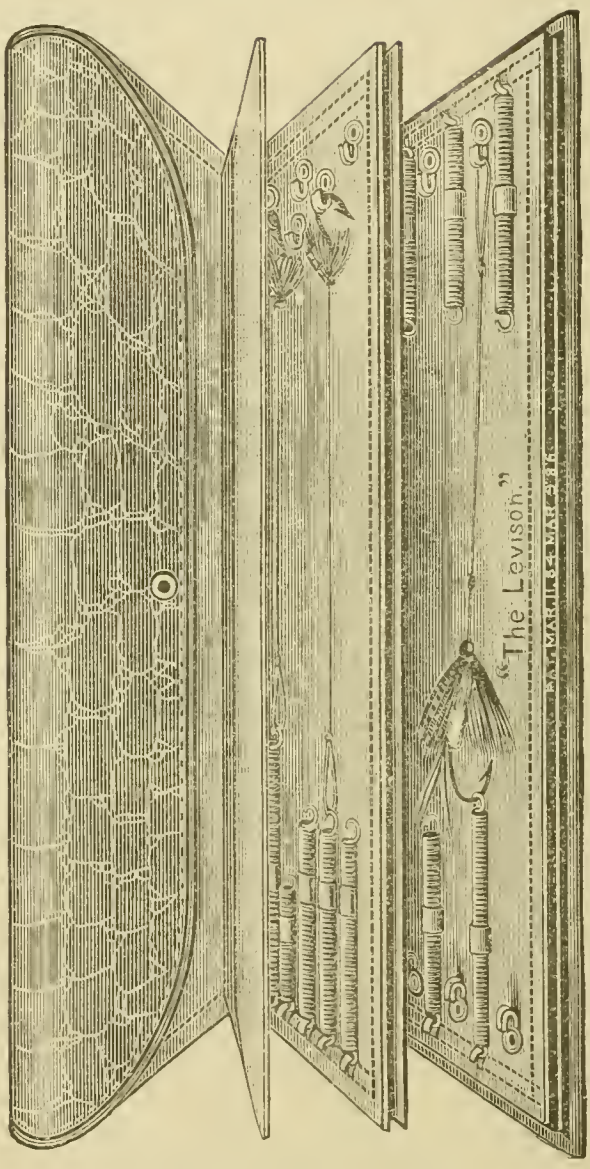


Patent "Chubb" Fly-Books.
(Thos. H. Chubb, Post Mills, Vt.)

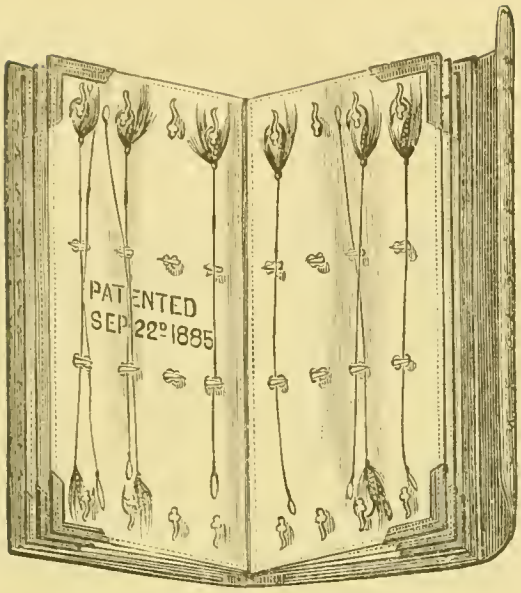
page by strong, flat nickel bars running through them and riveted to the page at the edges. These bars and the fly-frames are placed opposite to each other on the two sides of the leaf, and the ends are firmly riveted to each other through the leaf. The snells are very readily attached or detached, regardless of their length, and held straight. Between the fly-leaves are leather leaves faced with flannel, to absorb the moisture from wet flies. A large pocket is placed at one part of the book for leaders, and the whole is securely closed by a neat spring catch.

Thos. J. Conroy's "Improved" patent fly-book has double parchment leaves, with metal frame, firmly stitched together with silk. At each end are strong double nickel racks, riveted through to those on the reverse side of the leaf in a very secure manner. One bar of the double rack is fitted with flat metal hooks, and the other with neat spiral springs terminating also in hooks. The fly is affixed to the hooked end of the spiral spring at one end of the fly-leaf, and the loop of the snell is attached to the flat hook of the rack at the opposite end of the leaf, stretching the snell to its full extent, and, of course, keeping it perfectly straight. The racks, with their hooks and springs, are very substantially made, and hold a dozen flies to a page, between which are extra parchment leaves. The cover of the book is made entirely of leather, with a large leather pocket at each end of the book, and a parchment pocket for leaders. The whole is secured by a very neat and strong clasp.

A. B. Shipley & Son's patent fly-book is neatly made of leather, with pockets at either end for leaders and snelled hooks, or short-looped flies, and is closed by a strong spring clasp. The fly-leaves are made of double parchment, or of celluloid, neatly stitched and bound on the edges. They



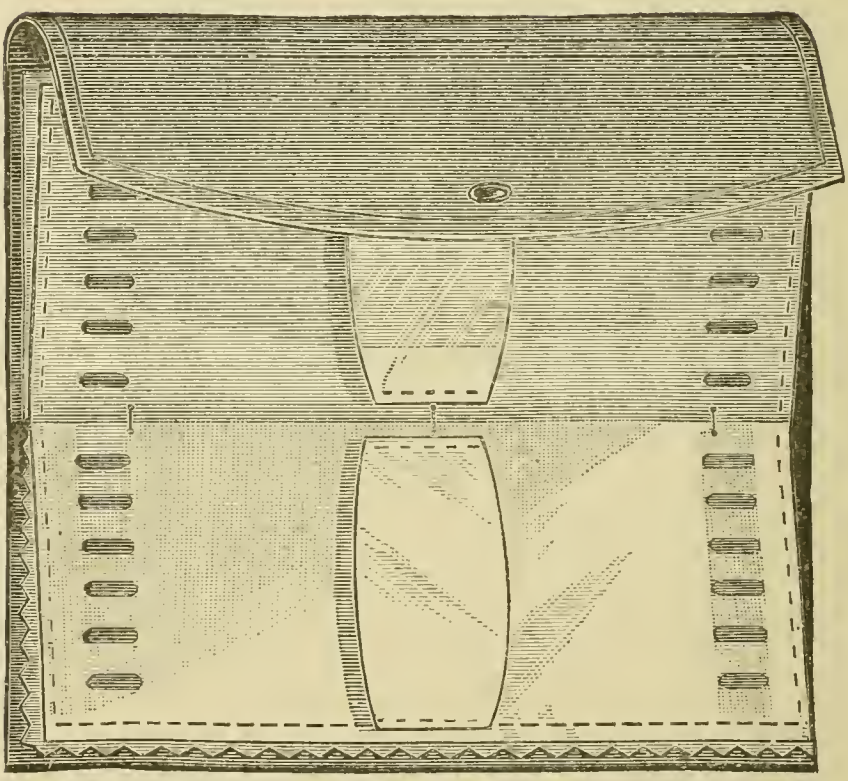
The "Levison" Fly-Book.
(Wm. Mills & Son, 7 Warren St., N. Y.)



Patent Celluloid Fly-Book.
(A. B. Shipley & Son.)

have metal clips at each end for attaching the fly-hook, with two rows of spring clasps between for securing the snell, keeping it straight without regard to its length. These clips and clasps do not increase the bulk of the book nor add much to its weight, while the flies are placed in position and removed very readily.

Mr. Thos. H. Chubb has patented and manufactures two styles of fly-book, both of which subserve the same purposes, though in a somewhat different manner. One has scalloped nickel frames at the two ends of the fly-leaf for affixing the flies, and two nickel bars at equal distances between, on which are placed short spiral springs for securing the snells, irrespective of their length. The other has corrugated nickel frames at the ends for the adjustment of the flies, with two nickel bars between, which have, instead of spiral springs, flat spring clasps for securing snells



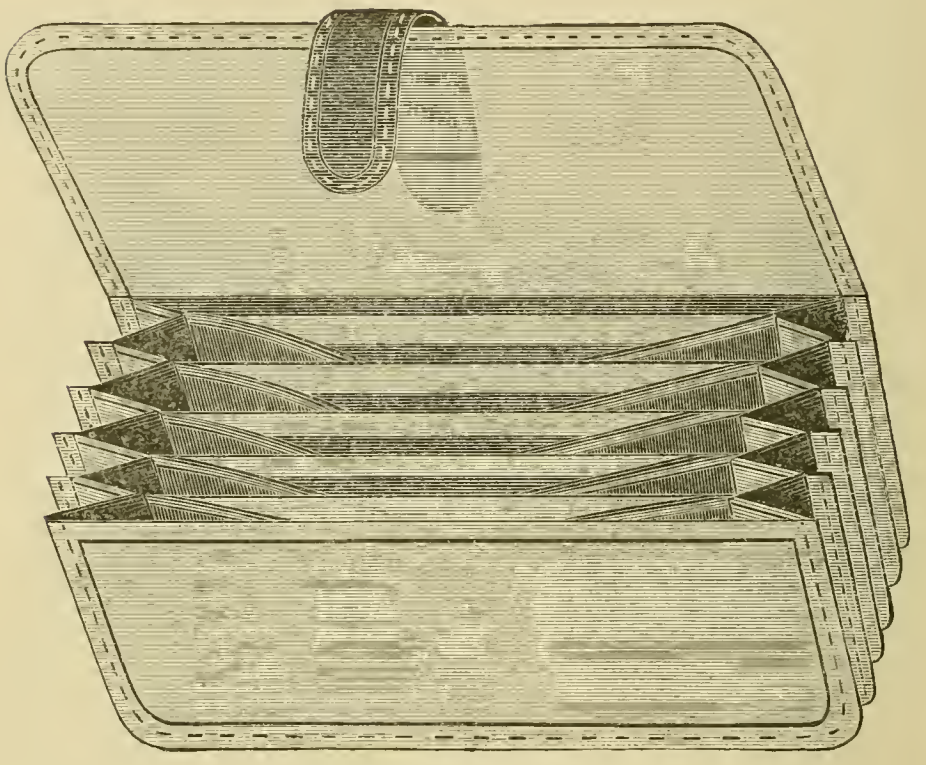
Patent Clip(Open)

The "Southside" Fly-Book.
(Abbey & Imbrie, 18 Vesey St., N. Y.)

of any length. The frames and bars are placed opposite to each other on the two sides of the leaf and riveted firmly together. The spiral spring page holds a dozen, and the flat spring page two dozen flies. Between the fly-leaves are leaves of leather and absorbent material. The books are strongly and neatly made of leather, and have pockets for leaders and snelled hooks, and are closed by durable spring catches.

Wm. Mills & Son's patent fly-book, the "Levison," is made of fine leather in the usual style, with pockets and metal clasp, in a first-class and durable manner throughout. The flies are adjusted by means of slotted hooks at one end and neat spiral springs at the other. By means of the slotted hook, snells with a knot, instead of a loop, can be as readily attached as the looped snell. The snells are kept perfectly straight and at full length by this method, and any fly can be removed without disturbing the others. The pages are arranged for both Black Bass and trout flies.

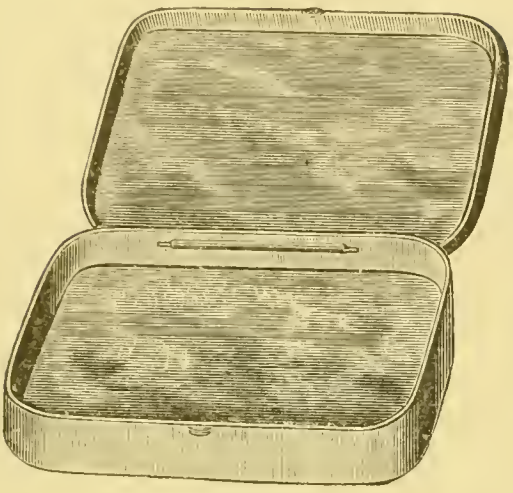
Abbie & Imbrie's patent clip fly-book is substantially made in several different sizes and styles, with leader pockets and felt leaves for absorbing moisture from wet flies. The flies and snells are attached at full length by the patent clips at the top and bottom of the pages, and very short snells are secured by parchment bands. The leaves are formed of double parchment neatly stitched along the edges. In addition to leader pockets, there are smaller ones for short-looped flies. The books are made entirely of leather and parchment, with an improved form of clasp. Mr. Imbrie also makes the "Endicott" book, on the spiral spring and patent clip principle, in addition to other styles of fly-books.



Hook and Tackle Book.
(Wm. Mills & Son.)

Tackle-Books.

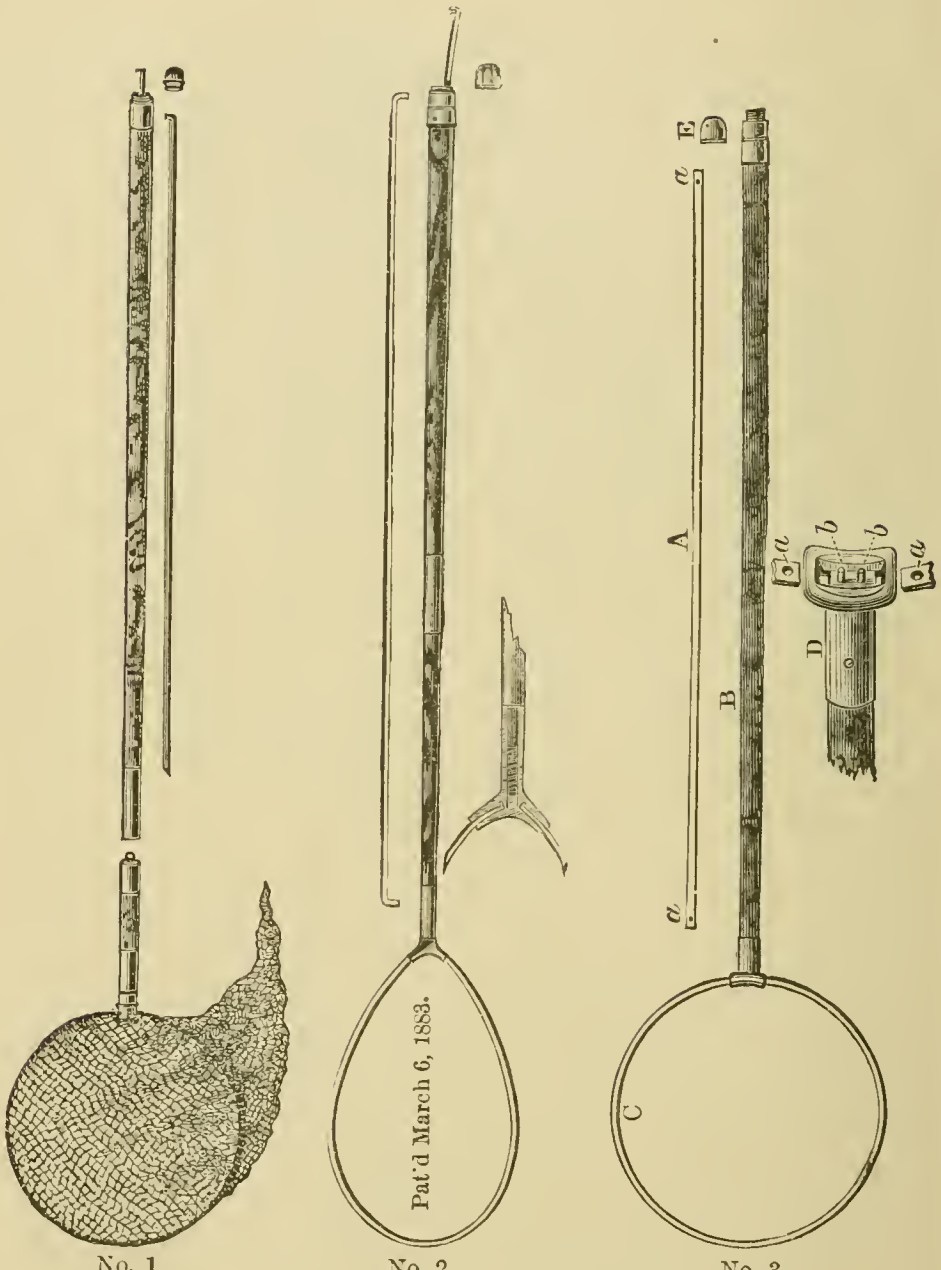
There is nothing handier than a good tackle-book. I have been shown one by Mills & Son which is made of leather, in the bellows or accordeon style, so that, like an omnibus, it is never full. It has half a dozen large pockets for leaders or snelled hooks, extra lines, wrapping silk, etc.; and each large pocket has a supplementary small one, which can be utilized for short-looped flies, loose hooks, sinkers, swivels, etc. Where looped leaders, double-looped snells and short-looped flies, or eyed-hook flies are used, it is just the article for holding them. It is firmly closed by a long leather strap and flat loops.



Leader-Box.
(Wm. Mills & Son.)

Leader-Boxes.

Before using leaders it is of course necessary to straighten them by soaking in water, or by the more tedious process of rubbing with gutta-percha. This often causes vexatious delay to the impatient angler, but it can be entirely obviated by the use of a leader-box. Almost any kind of a flat, round metal box will answer the purpose. I bought one in England, and a very nice one, with a small box in the center of the large one for eyed-hook flies, but it is too large to go into any pocket, unless one especially made for it. Another one that I procured from Mills & Son is just the thing. It will go into an ordinary pocket; has rounded corners, and being nickel-plated will not rust or tarnish. It is fitted with two pieces of thick felt, which, being dampened, enclose the leaders, which are thus always ready for use. Its cost is only fifty cents. Its size $3\frac{1}{4}$ by $4\frac{1}{2}$ inches.



No. 1. No. 2. No. 3.

Patent Landing-Net Frames.

No. 1. Chas. F. Orvis, Manchester, Vt.
No. 2. Wm. Mills & Son, 7 Warren St., N. Y.
No. 3. Thos. J. Conroy, 65 Fulton St., N. Y.

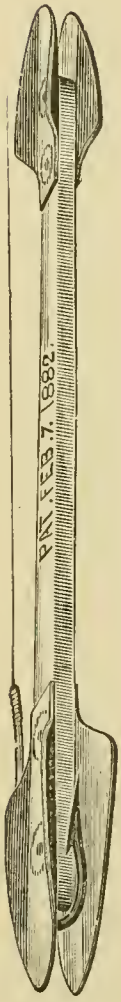
Landing-Nets.

There is no reason why the angler can not now be suited in landing-nets, for they are made in every style, from the simple wooden-bowed net to the more elaborate and portable net-frames of whalebone, steel and brass.

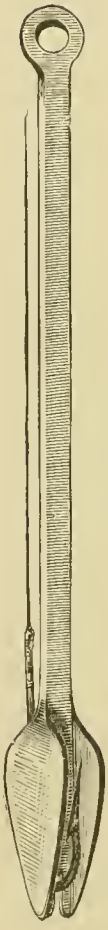
Mr. C. F. Orvis makes a very useful and meritorious net-frame, combining two handles, a long one and a short one, of bamboo, which are joined by a strong ferrule. The short handle is used in wading the stream and has a ring at the end for attaching a loop by which it can be fastened to a button on the coat or creel-strap. The long handle is for fishing from a boat or the bank. The rim of the net is a piece of flat steel, nickel-plated, and is readily attached to or detached from the handle; when not in use it is inserted into the long handle, which has a screw-cap at the end.

Wm. Mills & Son have patented the "Dorsal Fin" net-ring and handle, which is a very compact and convenient tool. The net-ring is made of flexible metal, brass or nickel-plated, which, when released from its socket at the end of the handle, can be straightened and inserted into the hollow bamboo handle. The net can be carried in the creel or the pocket.

The "Bailey" patent landing-net frame, sold by Thos. J. Conroy, is another example of the principle of carrying the net-ring in a hollow bamboo handle, and a glance at the illustration will show the method of attaching the ring to the handle. The ends of the spring-brass ring (A) have holes (*a a*) in them which are passed through slots in the ring holder and over the pins (*b b*), when the natural spring of the metal holds every thing firmly and securely.



Double Foard's Disgorger.
(Thos. J. Conroy.)



Single Foard's Disgorger.
(Thos. J. Conroy.)

Combination Disgorger.
(A. B. Shipley & Son.)

Disgorgers and Extractors.

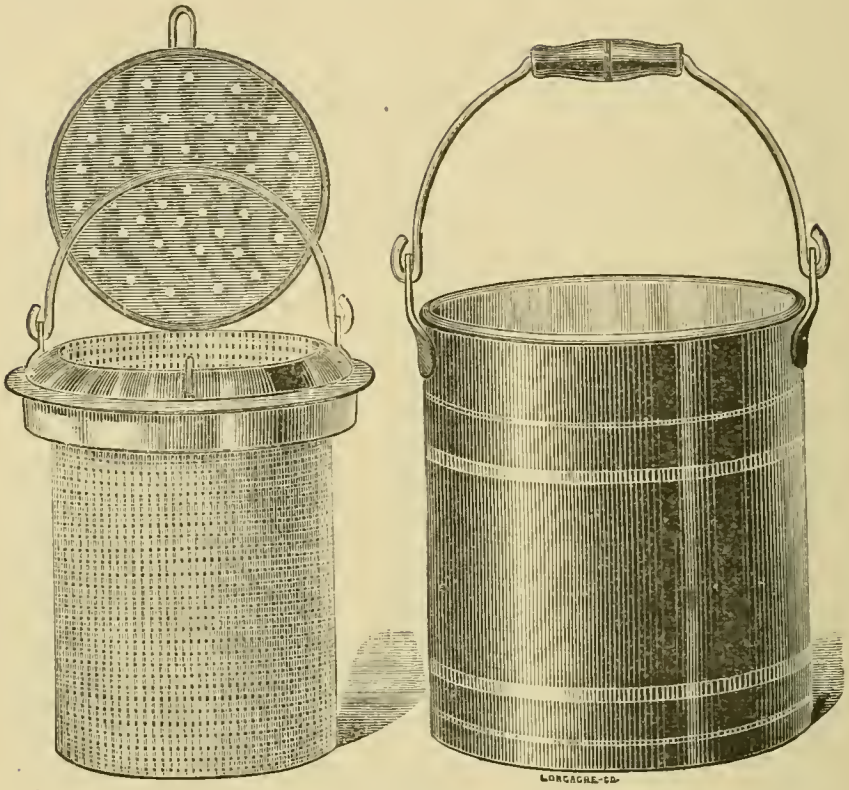
Very often a Bass, or it may be a pike, pickerel, or wall-eye, is hooked in the throat or gullet, and it is difficult to dislodge the hook. In order to render this easy to do, and at the same time to prevent the fingers of the angler from being scratched or lacerated by the teeth of the fish, a disgorger becomes a very useful tool. There are a number of ingeniously devised implements for the purpose.

One of the best is Foard's patent fish-hook extractor or disgorger, sold by Thos. J. Conroy. The directions for its employment are to use the end of the instrument corresponding to the size of the hook, draw the line taut, and run the instrument down into the bend of the hook; then clasp the line against the side of the shaft, and push the whole down till the barb is disengaged, and the hook will come out with the instrument.

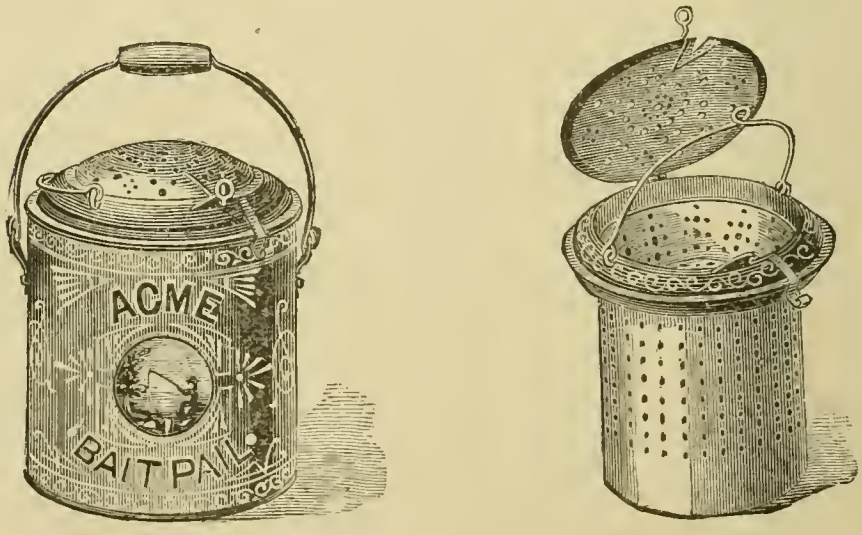
Another tool for this purpose is sold by A. B. Shipley & Son. It has a V-shaped knife at one extremity for dislodging the hook, the other being a screw-driver, while the shank of the instrument is a file. It is a very useful, convenient and portable combination. The file is useful for touching up the point of the hook, while the screw-driver may be required for taking apart a refractory reel.

Wm. Mills & Son have a disgorger with a long and stiff wire handle, the knife being a slotted tube, for admitting the snell, with the end of the tube ground to a sharp, cutting edge.

There are a number of other forms in the market, but these are among the best.



(A. B. Shipley & Son.)

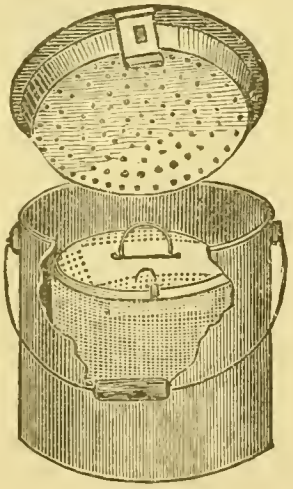


(Wm. Mills & Son.)

Minnow-Buckets.

The "Acme" minnow-bucket, of Wm. Mills & Son, is substantially made of heavy tin and handsomely japanned. The inside pail of perforated tin can be removed and placed in the water, thus keeping the bait alive for an indefinite time; it can be raised or lowered to allow the selection of a bait without wetting the hand. The continuous flowing of the water through the perforations, during transportation, has a tendency to aërate the water and keep the bait alive.

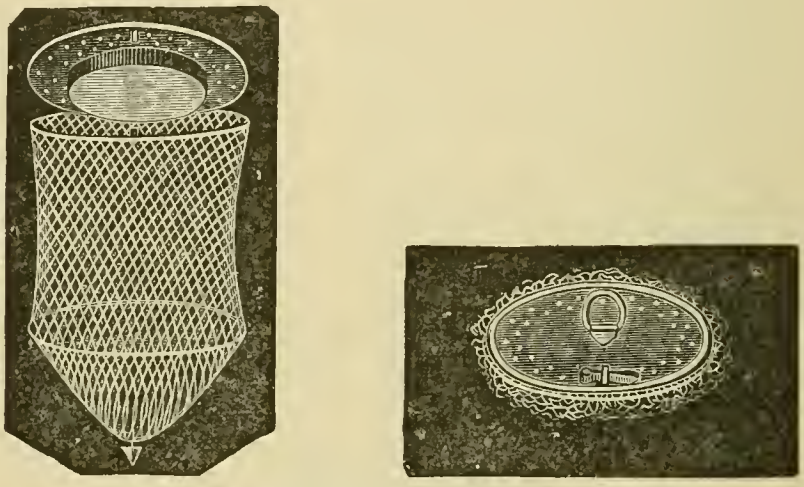
A. B. Shipley & Son's double minnow-bucket is strongly and durably made and handsomely japanned and ornamented. The inner pail is made of perforated tin, with plenty of space between it and the outer pail for a free circulation of the water. It has all the well-known advantages of the double pail.



Rudolph's Patent Floating Minnow-Bucket.
(A. G. Spalding & Bros.)

Rudolph's floating minnow-pail, sold by A. G. Spalding &

Bros., is one of the best articles in this line. The inside pail is made of strong galvanized wire-cloth, and has an air chamber secured to the inside of the lid, by means of which it will float at the surface of the water; and when fishing from a boat it can be made fast by a string, and the use of the outside pail can be dispensed with.

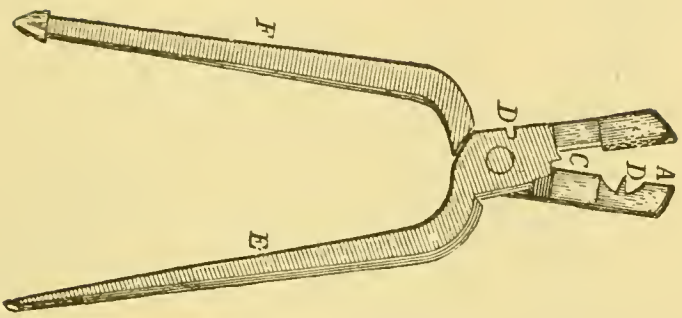


Rudolph's Patent Floating Minnow-Pocket.
(A. G. Spalding & Bros.)

The floating principle is also applied to a netted pocket, or minnow-bag, which is well adapted to the use of the angler when fishing a stream by wading. Or where there are two anglers in the same boat, each can have his minnow pocket at his own end of the boat, a convenience that will be appreciated by the social angler, who always wants a companion or two in his boat. The cuts show the minnow pocket ready for use, and folded.

Angler's Pliers.

A very useful little implement is shown below, combining six different tools in one, namely: *A*, strong round-



Angler's Pliers.
(Thos. J. Conroy.)

nosed pliers; *B*, knife for splitting shot; *C*, fine wire cutter; *D*, strong wire cutter; *E*, screw-driver; *F*, reamer. They weigh only four ounces, and are made of the best steel and in the best manner, and will be found thoroughly reliable. The cut is one half the size of the pliers. With this tool, a bit of string and a piece of wire, a broken rod or a disabled reel may be quickly remedied or repaired. It should be carried in every angler's pocket.

Rod Holder.

This device is intended for trolling or still fishing, and enables the angler to dispense with the services of a boatman. It can be fastened to either the gunwale, as in Fig. 2; or to a seat, as in Fig. 1. By means of the thumbscrew it can be adjusted to any angle or direction, as it works on a ball-and-socket joint. While the rod is held perfectly secure, it can be taken out or replaced in a moment, whether the reel is below or above the grip. The crotches for the rod are covered with soft rubber, so that there is no more liability of scratching or bruising it than

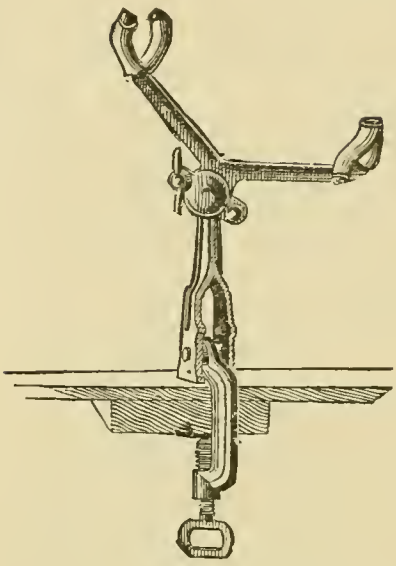


Fig. 1.

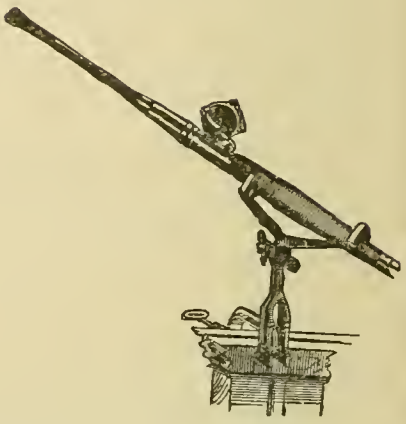


Fig. 2

Universal Rod Holder.
(A. G. Spalding & Bros.)

if held in the hand. It is made of malleable iron, neatly tinned, and is well adapted for the purposes of its construction.

Wading-Shoes.

A good wading-shoe is a great desideratum for the stream fisher. While leather brogans are very comfortable, and answer the purpose admirably, it is necessary to take the best care of them in order that they may be kept soft and pliable; a liberal application of castor oil, while wet, is the best plan for accomplishing this result. Very few anglers, however, attend to this matter as they should, and are very loth to give the needed attention to leather wading-shoes when through fishing; consequently, when next needed they are as hard and stiff as a board.

Conroy's Improved Wading-Shoes will be found to satisfy the average angler better than leather shoes. They are strongly made of heavy canvas, dry quickly, and do not

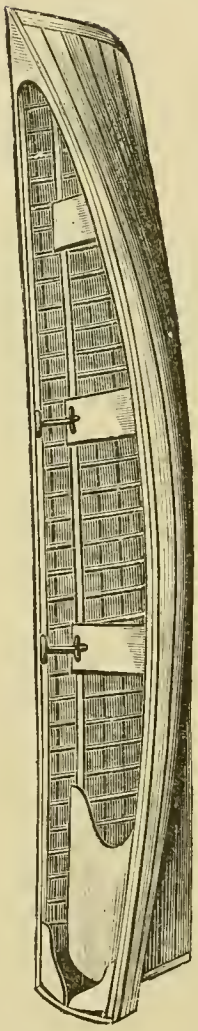
Improved Canvas Wading-Shoes.
(Thos. J. Conroy.)

harden with drying. They are supplied with soft hob-nails to prevent slipping on rocks, and may be worn with or without wading stockings.

Fishing-Boats.

In Black Bass fishing on lakes, ponds, and broad deep rivers, a boat is a *sine qua non*, and a part of the angler's outfit that should receive that attention which its importance demands. A good boat in every particular is a blessing and a comfort that can hardly be overestimated.

As a rule, anglers, while employing none but the best tools and tackle, do not give the same thought and care to the boats they use. They are inclined to accept any thing in the shape of a boat that will float, and seem to have an idea that all boats are cranky and leaky, from the calm indifference with which they will sit for a day with wet



"Eureka" Fishing Boat.
(R. J. Douglas & Co., Waukegan, Ills.)

feet, or the philosophic unconcern with which they will spend half their time in bailing out the water.

In the first place, a boat for fishing should be safe and light, dry, and capable of being easily rowed or paddled; and, in order to meet these requirements, considerable attention should be given to its model and construction. It should not be too long, and should have beam enough to give stability, but not so much as to render it logy.

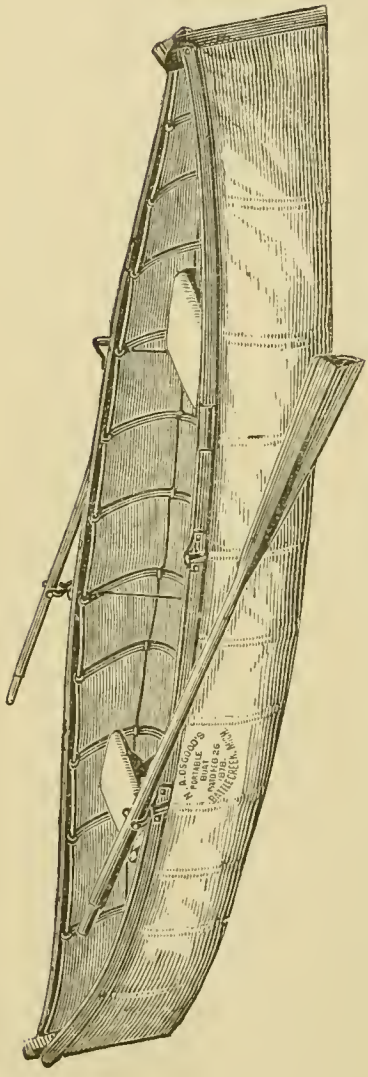
Of late years great attention has been given by builders to the construction of suitable small boats, for the angler and sportsman, at a moderate price, so that there is now no excuse for the employment of such death-traps as leaky scows and cranky, unsafe skiffs.

I am aware that most anglers, who use boats, depend on hiring them at the usual fishing resorts; but that is no excuse, for the amount usually paid for boat hire during a fishing vacation would be more than ample for the purchase and freight charges of a good, safe, dry and comfortable boat.

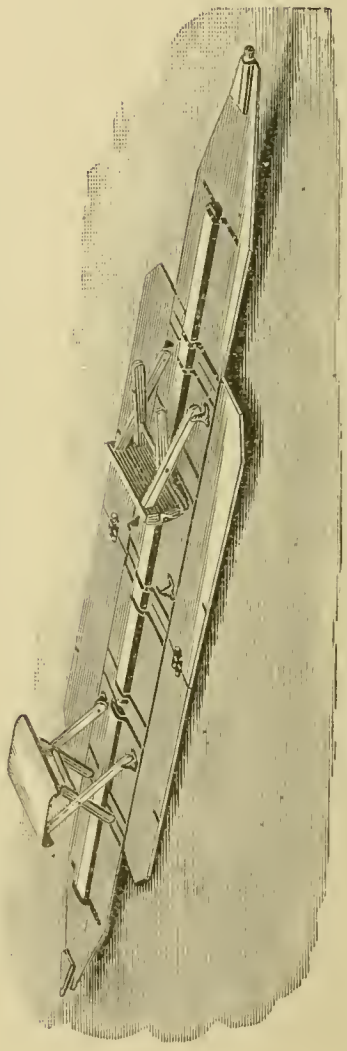
"Eureka" Fishing-Boat.

R. J. Douglas & Co., of Waukegan, Illinois, who build any thing from a steam-launch or a sloop-yacht to a ten-pound canoe, have given much thought and attention to the building of fishing-boats at a moderate price, and have succeeded in producing a very low-priced, yet well-modeled and desirable boat, one that an angler can afford to own who can spend but a few days in the year fishing.

They are enabled to do this by building this style of boat in large numbers, and in employing on them the same workmen the year round. They have them on hand, always, so that they can be ordered by telegraph, and the angler can



Osgood's Portable Folding Canvas Boat.
(N. A. Osgood, Battle Creek, Mich.)



Sectional Bottom-board of 12-foot Boat.
Showing Camp-stools and Side-boards.

be supplied with a good boat, almost anywhere, within a few days after ordering.

This style of boat they call "Eureka," and is made with either square or sharp stern, the former being the stiffest and best for angling. They are made in two sizes: 13 ft. x 36 in., or 15 ft. x 38 in., and 10 or 12 inches deep, and weigh about 100 and 110 pounds. They are built of basswood, pine, or white cedar, at twenty, twenty-five or thirty dollars. I have used a number of boats and canoes built by R. J. Douglas & Co., and can safely recommend their work, and particularly the "Eureka," for anglers. It is built as follows:

Instead of keel, it has a ten-inch bottom board, $\frac{7}{8}$ inch thick, which makes it perfectly flat on bottom, and it has five strakes on a side. The frames, stems and wales are of selected white oak, in all grades, and in basswood boats the bottom and first two strakes are of pine or cedar, and only the three upper strakes of basswood. The planking is $\frac{3}{8}$ inch thick in clinkers, and $\frac{1}{2}$ inch in carvel boats. The rowlocks are of their own design and the sockets are fastened on with bolts so that they can not pull off. Instead of wood knees, they use a malleable iron brace from wales to seat, which is also fastened on with stove-bolts. The boat is fitted with a good pair of ash oars and malleable iron rowlocks, is seated for three persons, and has three coats of paint on it. It makes a fine-looking, steady, strong and very serviceable boat for nearly all uses.

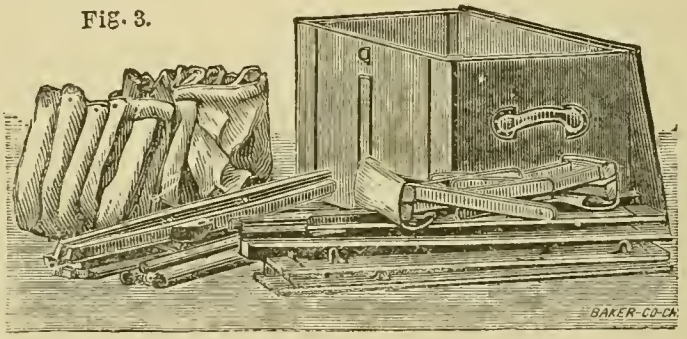
Osgood's Portable Canvas Boat.

If the angler wishes a portable boat, one that he can take in his buggy and drive to his favorite water near home, or pack in its box and ship by rail to any part of the country,

there is none that is so well known and so highly spoken of by sportsmen generally as Osgood's Portable Folding Canvas Boat; and it deserves all the praise bestowed upon it. It is as light as a birch-bark canoe, but stronger; it will live in a sea where an ordinary wooden skiff would be swamped. It has been in use for many years, and has withstood the severest tests; many improvements have been added since it was first introduced. Mr. Osgood says:

"As now made, it is as near perfect as it is possible to manufacture it. The canvas is drawn smooth, and all the fittings work easily. It has a perfectly modeled flat bottom, which makes it very steady and staunch, and entirely free from the roll of other boats of the same size. No danger of its tipping over. Any lady can row it, for it does not require one-half the strength to handle that a wooden boat does. It can be made ready for the water in five minutes, and no tools or ingenuity are required to set it up."

Fig. 3.



The above is a view of the boat in its compact or portable form, showing boat folded, bottom-board, camp-stools, gunwale, stretcher and packing-chest; oars and paddles are jointed, and pack in chest with boat.

The materials used in its construction are first class throughout. It is made in several sizes from 8 ft. x 33

inches, to 15 ft. x 36 inches, and weighs from twenty to seventy-five pounds, according to size, and the way it is fitted up. The best size for angling, for two persons, is 12 ft. x 33 inches, weighing with every thing complete fifty pounds. The price varies from thirty to fifty dollars, according to size.

PART III.

ANGLING AND FLY-FISHING.

CHAPTER XVIII.

THE PHILOSOPHY OF ANGLING.

The art of angling, with the improvements and appliances thereunto pertaining, will not suffer by a comparison with the progress of any other out-door recreation. The love of angling increases with the lapse of years, for its love grows by what it feeds on.

Wiser and more healthful and more humane sentiments now prevail among the guild than formerly, so that its practice more nearly approaches and deserves its appellation of the "gentle art."

Fishing for count, and the slaughter of the innocents, and the torturing of the fish, when caught, by a lingering death, now meet with the opprobrium of all true disciples of the craft, and have become abhorrent and despicable practices.

The genuine angler "loves" *angling* for its own sake; the pot-fisher "likes" *fishing* for the spoils it brings, whether captured by the hook, spear or seine.

The angler wending his way by the silvery stream, or resting upon its grassy banks, has an innate love for all his surroundings—the trees, the birds, the flowers—which become part and parcel of his pursuit; become true and tried friends and allies without whom he could no more love his art, nor practice it, than the astronomer could view the heavens with pleasure on a cloudy, starless night.

It is the love of the stream in its turnings and windings, its depths and its shallows, its overhanging branches and

grassy slopes, that gives to the art of angling its chiefest charm, and presents the Bass or the trout to the angler in its true and proper setting of leaves and flowers and sparkling water. If it were otherwise he would find as much pleasure in fishing in the flume of the fish-culturist, or in viewing the fish in the fish-monger's stall.

Truly, the stream and its surroundings are all in all to the angler. I am not much given to preaching, though I come of a race of preachers; but I can not refrain from presenting to the reader the following eloquent similitude and beautiful comparison between the angler's stream and the stream of Life; showing the easy and natural transition from the love of angling to the love of nature and nature's God. I feel more like presenting it because it is an extract from a sermon of one (Rev. Dr. H.) who has both the love of God and the love of angling deeply engrafted in his heart:

"Act, therefore, while the day calls. Live its life as if life were complete in it. Not that it contains all varieties of experience, but so joins the days before and after as to make them one stream, which your spirit should wade cheerily as the trout fisher wades his brook.

"His brook is wild, because the trout love waters where boats can not follow them, nor even lumber logs roll free; waters that twist and plunge, and shoot and eddy, with many a snag in the midst and fallen tree across.

"And there the fisher seeks them by an instinct like their own —loving the bends that lock the pools, the shoals that embank the deep, the concealment of trackless woods, with their twilight noons and mystic noises, and every difficulty that teases him to more eager quest of his water-sprites.

"When no upward flash meets his fly he reels his line in ex-

pectation to give a merrier hum to the next throw, and again to the next, until all expectations are fulfilled at once when his wrist tingles to the trout's jerk and swirl and jump.

"And still that wrist tingles through casts that take no prize, until another capture renews its thrill. Broken leaders, snarled lines, torn garments, bruised limbs, do not spoil his hilarity, which feels the whole day's sport in every minute, the whole brook's beauty at every step.

"And so with life. It is to be lived as a whole. Happiness comes from an energetic sense of its entire significance in every passing phase of it—in mystery, as giving value to knowledge—in failure, as the guage of success—in evil, as the condition of good, which indeed is but evil overcome, and without the evil could not be—and in all alike as strides and casts of the confident soul, whose trout-stream from end to end is God.

"And if by these the soul gains nought else, it gains immortal health; fills its creel with secrets of infinite love and wisdom—wisdom too loving to wish less than man's perfection—love too wise to spare any pain necessary to attain Godlike end. Luck enough for time or eternity. Nay, eternal sport in time."

CHAPTER XIX.

CONDITIONS WHICH GOVERN THE BITING OF FISH.

After a careful reading of this chapter it would seem that there was nothing to add to this very uncertain subject; for we really know very little about it. We only know that when fishing a favorable locality where there are "thousands" of Black Bass, or even in small, circumscribed waters where there are certainly "hundreds," we do well, by the most careful fishing, to secure a half-dozen or a score of fish, as the case may be, on the most propitious occasions.

Why is it then that so few, out of so many, respond to the angler's fly or bait? It is best that it is so; but why is it so? This is the query that naturally rises to the angler's mind, especially after an unsuccessful day.

I might answer this question by asking another: Why is it that the sportsman in a day's outing, with the best dogs, finds so few grouse or quail in comparison to the great numbers known to "use" in certain localities?

The inference is plain in either case, for self preservation is the first law of nature; but while the sportsman is fully conscious of this, the angler is usually not so logical, because he does not reflect upon the fact that the fish is as fully aware of his presence as the grouse or quail is of that of the sportsman and his dogs.

Then again we should not expect to find all the fish on

the feed at the same time; if we did so we would have no cause to complain of their not rising or biting. In the struggle for existence among animals, including fishes, it is the majority that obtains enough to satisfy its wants, and the minority only that does not. Then it is from the minority that we must look for the few that are likely to see and take our lure.

Predacious fishes feed almost entirely at night, only the hungry ones, perhaps, that do so during the day; and though we often take fish with their stomachs full, they are evidently still on the feed, for such food is usually in a fresh or undigested condition, showing that it has been recently swallowed.

Predacious fishes are more active during the night, and, I believe, rest or sleep during the day, while the smaller fishes, as minnows, etc., are more active during daylight; for it is not unlikely that they seclude themselves, or keep in very shallow water, during the night, to prevent their being swallowed by their larger and piscivorous congeners.

As predacious fishes then feed mostly by night, we would naturally expect to find them at that time where their food was most plentiful; and this is really the case, for I have observed that they were always near the shores or on the shallows at night, in water so shallow, in fact, that their dorsal fins were often out of the water. Any one who will take the trouble to proceed cautiously along the shores at night, with a lantern, can verify this statement.

It is well known that the last few hours of daylight are the best for fly-fishing, which I account for by the fact that the fish are then approaching the shallows and shores in their nightly search for food; and as they only rise to the

fly in comparatively shallow water, the conditions are thus more favorable for the fly-fisher.

The hypothesis, then, that game fishes feed mostly at night and rest or sleep by day, and that it is only the few that failed to fully satisfy their appetites the night before that are apt to respond to the wiles of the angler, is quite a reasonable one, and one that will account for most of the "bad luck" of the angler.

CHAPTER XX.

THE BLACK BASS AS A GAME FISH.

Owing to my admiration for the Black Bass as a game fish, and my championship of its cause for many years, and my efforts to place it in the front rank of game fishes, and my desire to have it placed in new waters, I am sometimes, thoughtlessly and unjustly, accused of being opposed to the brook-trout, and of advising the stocking of trout-streams with my "favorite" fish. Nothing can be further from the truth.

I am utterly opposed to the introduction of Black Bass into waters in which there is the remotest chance for the brook-trout or rainbow-trout to thrive. I yield to no one in love and admiration for the brook-trout. I was perfectly familiar with it before I ever saw a Black Bass; but I am not so blinded by prejudice but that I can share that love with the Black Bass, which for several reasons is destined to become the favorite game-fish of America. "My offending hath this extent, no more."

Let us look this thing squarely in the face. I do not wish to disturb any one's preference, but I do want to disabuse the minds of anglers of all prejudice in the matter. The brook-trout must go. It has already gone from many streams, and is fast disappearing from others. It is sad to contemplate the extinction of the "angler's pride" in public waters, but the stern fact remains that in this utilitarian age its days are numbered and its fate irrevocably sealed.

As the red man disappears before the tread of the white man, the "living arrow" of the mountain streams goes with him.

The trout is essentially a creature of the pine forests. Its natural home is in waters shaded by pine, balsam, spruce and hemlock, where the cold mountain brooks retain their low temperature, and the air is redolent with balsamic frarance; where the natural food of the trout is produced in the greatest abundance, and where its breeding grounds are undisturbed.

But the iron has entered its soul. As the buffalo disappears before the iron horse, the brook-trout vanishes before the axe of the lumberman. As the giants of the forest are laid low, and the rank and file decimated, and the wooden walls of the streams battered down, the hot, fiery sun leaps through the breaches, disclosing the most secret recesses of forest and stream to the bright glare of mid-day. The moisture of the earth is dissipated, the mosses and ferns become shriveled and dry, the wintergreen and partridge-berry, the ground pine and trailing arbutus struggle feebly for existence; the waters decrease in size and increase in temperature, the conditions of the food supply and of the breeding-grounds of the brook-trout are changed; it deteriorates in size and numbers and vitality, until finally, in accordance with the immutable laws of nature and the great principle of the "survival of the fittest" (not the fittest from the angler's point of view, but the fittest to survive the changes and mutations consequent on the march of civilization), it disappears altogether.

Much has been said about the "trout hog" in connection with the decrease of the trout. But while he deserves all the odium and contempt heaped upon him by the honest

angler, the result would be the same were the trout allowed undisturbed and peaceable possession of the streams, so far as the fish-hook is concerned, while the axe of the lumberman continues to ring its death knell.

Let us, then, cherish and foster and protect the crimson-spotted favorite of our youthful days as long as possible in public waters, and introduce the rainbow-trout, or the Dolly Varden, or some of the Pacific black-spotted trout, or the English brown trout, when he has disappeared; and when all these succumb, then, and not till then, introduce the Black Bass. But let us give these cousins of the brook trout a fair trial first, and without prejudice. There are plenty of lakes, ponds and large streams in the Eastern States into which the Black Bass can be introduced without interfering with trout-waters.

For many years to come brook-trout will be artificially cultivated, and the supply thus kept up in preserved waters by wealthy angling clubs; but by the alteration of the natural conditions of their existence they will gradually decrease in size and quality, until finally they will either cease to be or degenerate to such a degree as to forfeit even this praiseworthy protection.

I must dissent from the statement sometimes made that the Black Bass is the bluefish of fresh waters. The Black Bass is voracious—so are all game fishes—but not more so than the brook-trout. The character of a fish's teeth determines the nature of its food and the manner of its feeding. The bluefish has the most formidable array of teeth of any fish of its size—compressed, lancet-shaped, covered with enamel, and exceedingly strong and sharp, in fact, miniature shark teeth—while the Black Bass has soft, small, brush-like teeth, incapable of wounding, and intended

only for holding its prey, which is swallowed whole. The brook-trout has longer, stronger and sharper teeth than the Bass, and a large, long mouth, capable of swallowing a bigger fish than a Black Bass of equal weight. The mouth of the Bass is very wide, for the purpose of taking in crawfish with their long and aggressive claws, and not, as supposed by some, for the swallowing of large fishes. The Black Bass gets the best of other game fishes, not by devouring the fishes themselves, but by devouring their food. For this reason, more than any other, they should not be introduced into the same waters with brook-trout. The pike or pickerel is the bluefish of fresh waters, and in dental capacity and destructive possibilities is not far behind it.

The brook-trout, I think, is the most beautiful of all fishes, as a fresh-run salmon is the handsomest and most perfect in form. The salmon is a king, the brook trout a courtier, but the Black Bass, in his virescent cuirass and spiny crest, is a doughty warrior whose prowess none can gainsay.

I have fished for brook-trout in the wilds of Canada, where a dozen would rise at every cast of the fly, and it would be a scramble as to which should get it—great lusty trout, from a half pound to two pounds in weight—but the black fly made life a burden by day, and the mosquito by night. The glory and beauty of the madly rushing stream breaking wildly over the great black rocks, and the quiet, glassy pools below reflecting the green spires of spruce and fir, availed nothing to the swollen eyelids and smarting brow.

I have cast from early morn till dewy eve, on a good salmon stream in New Brunswick, for three days in succession without a single rise. I have cast standing in a birch-bark

canoe until both arms and legs were weary with the strain, and then rested by casting while sitting—but all in vain. The swift-flowing, crystal stream reflected back the fierce glare of the northern sun, and flowed on in silence toward the sea. The fir-clad hills rose boldly on either side, and stood in silent, solemn grandeur—for neither note of bird nor hum of bee disturbed the painful silence of the Canadian woods.

At such times would flash on memory's mirror many a fair scene of limpid lake or rushing river, shadowed by cool, umbrageous trees, and vocal with myriads of voices—where the Black Bass rose responsive to the swish of the rod and dropping of the fly. Or, should the Bass be coy and shy, or loth to leave his lair beneath some root or shelving rock—the melody of the birds, the tinkle of a cow-bell, the chirp of a cricket, the scudding of a squirrel, filled up the void and made full compensation.

The true angler can find real pleasure in catching little sunfish, or silversides, if the stream and birds, and bees and butterflies do their part by him; while the killing of large or many fish, even salmon or trout, in silence and solitude, may fail to fully satisfy him.

I can find something beautiful or interesting in every fish that swims. I have an abiding affection for every one, from the lowly, naked bull-head, the humble scavenger of the waters, to the silver-spangled king who will not deign to soil his dainty lips with food during his sojourn in crystal streams, and I love the brook-trout best of all. But, as an angler, I can find more true enjoyment, more blessed peace, in wading some rushing, rocky stream, flecked by the shadows of overhanging elm and sycamore, while tossing the

silken gage to the knight in Lincoln-green, my ears conscious of the rippling laughter of the merry stream, the joyous matin of the woodland thrush, the purring undertone of the quivering leaves—my eyes catching glimpses of hill and meadow, wren and robin, bee and bittern, fern and flower, and my breath inhaling the sweet fragrance of upland clover and elder-blossom—I say I can find more true enjoyment in this—than paying court to the lordly salmon, or the lovely trout, in its stiff and silent demesne, with annointed face, gloved hands, and head swathed in gauze. If this be treason, my brother, make the most of it. I am content. It is my honest conviction. After killing every species of game-fish east of the Rocky Mountains, from Canada to Florida, and a few in foreign lands, I find the knightly Bass and his tourney-field all sufficient.

CHAPTER XXI.

FLY-FISHING.

The literature of Black Bass fishing may truly be said to have been evolved during the past decade. Previous to this period very little mention was made of the two species of Black Bass by our angling authors, and that little was misleading, incorrect or glaringly false in most instances, and related, almost without exception, to bait fishing. Fly-fishing for Black Bass, although then practiced by a few anglers, was apparently unknown to writers on angling. Indeed, it was doubted by many, and denied by most anglers, that the Black Bass would rise to the artificial fly; but this, in my opinion, was due more to prejudice than to the result of actual experience, and viewed in the light of our present knowledge of the subject, this opinion is certainly strengthened, if not confirmed.

Up to that time the brook-trout was deservedly the pride and idol of the fly-fisher, and it was deemed heresy to cast the fly for any other fish, with the exception of the salmon. But while yielding to none in my love and admiration for the brook-trout, it is a pleasure for me to state that, in my opinion (based on a large experience), there are no waters inhabited by the Black Bass, large or small mouth, where it will not rise to the artificial fly at some season of the year, subject to certain states and conditions of the water, etc., and this is as much as can be said for the brook-trout, as all unprejudiced trout-fishers must admit.

It is true that the Black Bass rises to the fly more freely and uniformly in some waters than in others, but this fact holds good also as to the brook-trout. And likewise is it a truism, that the largest fish, trout or Bass, do not, as a rule, take the artificial fly. Those who wish to lure the finny giants must perforce use bait or the trolling-spoon. This is a damaging admission to our piscatorial pride, but candor compels us to acknowledge the correctness of it, though we may find some guilty consolation or quasi-satisfaction in exhibiting the huge piscine trophies to our admiring and credulous friends with the usual remark: "Caught on the fly!"

Seriously, it is entirely unnecessary, at this late day, to argue that the Black Bass will or will not rise to the artificial fly. The fact is now known to many anglers, and conceded by others, that the Black Bass is a game-fish of high degree, and when of equal weight is the peer of the brook trout or salmon in fighting qualities, when proper tackle is employed, and will rise to the fly under the same favorable conditions.

Practical Hints.

In order to be successful in fly-fishing for Black Bass, the angler must know the waters to be fished, or be possessed of that knowledge of the haunts and habits of the Bass that is born only of much experience. He must know when and where the fish are to be found at the different seasons of the year; when they frequent deep, and when shallow water, for it is love's labor lost to cast the fly on deep, still reaches of water.

In stream-fishing, which is by far more preferable and enjoyable than lake or pond-fishing, it is only when the Bass are on the shallows or on the riffles that the fly-fisher

will fill his creel, and on lakes when they frequent reefs, shoals, bars, and the neighborhood of rushes and weed patches. These times are usually in the spring or early summer, and in autumn, for in midsummer the Bass retire to deep water, except in large, deep and cool lakes, when this season is often the best, as the water has then become of the right temperature to induce the fish to seek shallow feeding grounds.

The habits of the brook-trout have been carefully studied by many generations of fly-fishers and naturalists, consequently the trout-fisher knows that during the summer months he will certainly find his quarry in the shallow streams, slowly but surely ascending toward their spawning grounds. He also knows that the big trout has a local habitation under some root, or rock, or hollow bank, which he holds by right of possession, and defends as bravely as ever knight of old his feudal stronghold. He knows, furthermore, that he would be considered daft to whip the deepest pools of exposed water, or the mid-surface of deep lakes or ponds. So, when the Bass-fisher knows the habits of the Bass as well, there will be less speculation as to whether or not he will rise to the fly.

The stream should always be waded, if practicable, and fished with the current, for it follows that wherever the angler can wade, the water is about right in depth for fly-fishing. He should cast about him in a semi-circle, he being at the center and his casts being the radii, like the spokes of a wheel; then, lengthening his cast, he can describe the arc of a larger circle, and so cover all the water within reach (within forty or fifty feet), giving preference, of course, to the likeliest spots, as the eddies of bowlders or half-submerged rocks, near logs, driftwood, shoals, bars,

and under overhanging bushes and hollow banks, and over the shallow pools above and below rapids and riffles.

After casting, the flies should be roved, skittered or danced over the surface by jerky or tremulous movements, to imitate, as nearly as may be, a living fly, and then be allowed to sink several inches below the surface and float away like a drowned insect to the extreme length of the line.

On lakes, where there is no current, the flies should also be permitted to sink over likely spots at almost every cast. Lakes or deep ponds should be fished from a boat, keeping in the deeper water and casting inshore on the bars, shoals, reefs or ledges, or along the edges of rushes or weed patches. Sometimes rushes or tall weeds grow in pretty deep water, but nevertheless the Bass will usually be found near or among them, and sometimes near or under floating logs or drift; it is well to try all such places.

It will be found that Bass rise to the fly more freely when the water is stirred or ruffled by a brisk breeze, and during the early morning hours and late in the evening; about sunset, or a little after, being the very best time on bright days. On cloudy days there is not much choice, as one hour is no more favorable than another, sunny days being always the best.

The old rule of light-colored flies for dark days and toward evening, and dark flies for bright days, is a safe one to follow, the exceptions rather tending to prove the rule, which usually happen when the fish are well on the feed, and will take almost any fly offered; thus it is frequently the case that dark flies will kill in the dusk of evening as well as the "Miller" or "Coachman."

It only remains now to say to the reader, as I have often

said before, cast as skillfully as you can, but always deliberately and carefully. Always keep a taut line; strike quickly upon sight or touch, and play and land your fish in your own way, but get him in the creel as quickly as you can with safety to your tackle; kill your fish outright before putting him in your basket; do not fish for count; keep your temper; and, above all things, remember first, last and all the time the most important rule in fly-fishing—keep out of sight of the fish if you would have him notice your flies.

A Reminiscence.

Toward the close of a day in the mild September, I was leisurely riding my tired mare across the ford of a narrow rocky river that wound around the foot of a thickly-wooded cliff, with here and there a pool in the shadow or a ripple in the sun, while stretching away a mile or two across the fertile bottom lands were fields of waving corn, fragrant clover, blue-grass and broad-leaved tobacco.

Up the stream a hundred yards away, stood, leaning over the water, an old stone mill, whose lichen-covered walls and moss-grown roof proclaimed its hoary age. Its old wheel went rumbling on its merry round, mingling its regular, rhythmic plashing with the monotone of the tumbling, rushing waters of the dam.

Down the stream another hundred yards, an old-time, covered bridge, decrepid and gray, spanned the little river, casting cool and dark shadows beneath and below.

The sun was sinking low beyond the fields, flinging bars of yellow flame through the slender strips of fleecy clouds that stretched across the western portal of the steel-blue sky, lighting up the crimson of the newly-dyed sumach on the cliff, flashing on the foaming waters of the falls, and fes-

tooning with golden streamers and silver ribbons the long, dank, green arms of the old water-wheel.

Beneath the bridge a group of ruminating, sleek-coated cows stood whisking their tails in calm contentment, as the grateful stream laved their cloven feet and their breath exhaled the odors of sweet cream, white clover and golden butter.

As my mare drank deeply from the refreshing stream, I gazed upon the lovely scene, and thought that nowhere else in all the world but in this broad land of ours could such a a view be found.

The sublime glories of the Alps; the soft Italian skies; the splendors of the Tropics; the olive-crowned hills of Andalusia; the vine-clad slopes of the Riviera—all alike paled before this calm and peaceful, soul-filling, heart-satisfying, *homelike* scene.

But what was that?—a bar of silvery sheen flashed for a moment in the sun and dropped back into the eddy behind yon huge gray boulder under the cliff! I pretend to be surprised, but—pshaw! how idle it is to attempt to deceive oneself. All the time that I was hollowly and falsely descanting upon the matchless beauty of the stream and its surroundings, I, like an artful, double-tongued hypocrite, was watching for the very thing that occurred—the leap of a Bass!

Silently I rode my mare to the shade of the cliff, tied the reins to the convenient limb of a low-branching elm, unstrapped my umbrella from the saddle, and from its folds drew forth a fly-rod that had been artfully and surreptitiously concealed there—another evidence of the insincerity of man.

From a corner of my pill-bags I brazenly took out a

buckskin bag, in which was a small click-reel with its line of enameled silk. From a pocket of my professional coat I brought to the light of day what, ostensibly, purported to be a prescription book, but in reality was a book of flies!

How guilty I felt! What an arrant humbug I was! But there was no time for moralizing—I just heard the splash of another Bass! I soon had rod and reel, line and leader together, and a "polka" and a "professor" were soon dancing over the water together!

I had stepped from bowlder to bowlder, in the shadow of the cliff, until I had reached a vantage point at the foot and edge of the riffle, with the sun in my face and broken water all around me. I knew of half a dozen deep holes and sheltered eddies within the length of my cast, from which I would be completely hidden by two jagged rocks that rose in front of me, half as high as my head.

Then like a guilty thing I began casting in ever-widening circles—all the time pretending to watch the play of the sunshine on the water, or the blackbird that was drinking at the verge of the stream.

Then I saw a swirl behind the gray bowlder—but pretended to be listening to a squirrel barking at me from the projecting limb of a hickory, whose glossy, green leaves were just touched with the faintest suspicion of old gold.

Then I made another cast as straight as the maple boll behind me. The flies dropped just over and beyond the smooth, gray bowlder, and as they were drawn into its eddy the "polka" disappeared, and something seemed to lift the water just there for an instant, and then—what a lively *staccato* to that kingfisher's rattle!

But, bless my soul! it is my reel that is giving so merry a hum! I must stop that. Then, as I follow the erratic

flight of a dragon-fly across the stream, I can't help observing my strained line cutting like mad through the water, and as I look up at a crow flying overhead I see that my rod is bent, and strained and twisted, and altogether there seems to be something unusual going on in the water, and as I look—out into the sunshine with bristling fins and red, extended jaws there leaps a Bass!

Then I am kept busy leading my line away from jagged rocks in front, and can only do so by holding my rod at arm's length above my head. But now I have led the captive into the deep pool below me, and near the cliff. Then I have leisure to look up at my squirrel, who, with a hickory nut in his paws is raining down the pieces of its hull in a green shower at the river's side, and—there leaps the Bass again!—and again! Then again the singing of the reel as he dives to the depths of the pool.

Ah! listen to the *allegro* of the mocking-bird atop of yonder beech, as he begins his sunset *sonata*—the click of my reel a castinet accompaniment—and now, while slowly reeling in the line, the *andante* of the glorious songster is poured out on the quivering air—and then the *trio*—the bird and Bass and I—and last of all the *finale*, as I drop the butt of the rod and the reel into my coat pocket, and hug my vertical rod, while lifting out the spent warrior in green and silver sheen, and quickly dispatching him, toss him among the ferns at the foot of the hickory, to the great displeasure of my squirrel, who scolds and scampers away with the nut in his cheek.

Then, filling my pipe, the blue smoke ascends in curling wreaths and is borne away up the face of the cliff on the soft evening air, while the tinkle of a cow-bell and the hoot of an owl comes from the direction of the old bridge.

But the sun is on the edge of the horizon, the fall is bathed in flame, the mill-wheel is hung with rubies, the belated crows caw loudly, and the "professor" and the "polka" are dancing on saffron and crimson foam to the strident strains of the cicada's fiddle. What, another rise? Another Bass, perhaps! No, it must have been a swallow dipping its wing.

The gentle swish of the supple rod is music sweet as the "professor" and the "polka" follow each other, now in aerial flight, now along the shining water. Egad! there's no mistaking that tug! The reel and the cicada now have it! The line hisses through the water! Look out for the sharp rock! See that blundering bat! Ah, what a leap! —how he dashed the golden, crimson rain! Again the *duet*—the shrill cicada and the buzzing reel! He breaks again, again falls back! The rod is bending, surging through the air—and now the frogs pipe up—the sun is down—and, bless me! here's another Bass!

I step ashore, and string them on a willow wand. The mill-wheel has stopped; the water tumbles over the fall with a lonesome sound. The whippoorwill is calling from the cliff. The squirrel is in his nest. The mocking-bird has found his mate. The cows are lowing at the farmer's gate. My patient nag is neighing for her master. "All right, Jenny!"

I do not feel so guilty in the gloaming; and as the first silent star appears, I stop at the little tumble down gate before the cabin of "Old Dave," who "cot de rheumatiz in de fresh' las' spring."

"Hello! Aunt Judy. How's Uncle Dave?"

"Howdy, Doctah! Lor' bress you, honey, de ole man's mitey po'ley—jist kin hobble roun', an' dat's all. He

'lowed to 'gin cuttin' 'bacca fer Mars' Brack nex' week—but 'less he men's mitey fas' he won't cut more 'n a 'bacca wum kin chaw! Don't tink he's long fer ole Kaintuck, no how!"

"Come here, Aunt Judy; here's two nice Bass for you—they 'll go nearly two pounds apiece. A gentleman fishing down at the river gave them to me as I came along. They 'll make a fine breakfast for you and Uncle Dave in the morning. Good night!"

And Jenny and I jogged along toward home, under the bright stars, at peace with all the world.

CHAPTER XXII.

CASTING THE MINNOW.

The capabilities of the minnow-casting rod are equal to most of the possibilities of bait-fishing, as it has been my good fortune to prove on many occasions. To the unversed in the real art of angling it is simply wonderful to see what an amount of strain the little rod will successfully endure, and to witness the comparative ease with which exceptionably large fish are killed by one who knows the latent virtues of this little giant of a rod.

Long ago, before every island boasted a summer cottage and a steam-launch, and when the Black Bass, or mascalonge, were to be found in almost every rock-bound, lily-fringed cove, the Thousand Islands of the St. Lawrence possessed attractions for the lover of the beautiful and the angler that is hard to realize at the present day.

Such a time I remember well; and one day of that halcyon period is marked on the calendar of memory by a pure white stone that sometimes, when the fit of retrospection is on, shines out vividly in the "hollow down by the flare" in the bright coal fire in the grate, or in the log fire in camp.

It was below Grenadier Island, in the shallower portion of the river, along the edges of the rushes, deer-tongue and water-lilies, that a dear friend (poor Dick! he is dead now) and I were casting the minnow for Black Bass. On that lovely July morning I killed, on an ash and lancewood,

eight-ounce rod, a mascalonge weighing thirty-two pounds, in twenty minutes.

But, it is under the palms and live-oaks of Southern Florida that the angler is more likely to encounter finny giants that will test the strength and endurance of his tackle, and exercise to the full his stock of piscatorial skill and finesse.

A few days after Christmas, in the winter of 1881, my wife and I were fishing in San Sebastian river (opposite Kane's cabin), a half mile above its confluence with Indian river. We had been up one of the branches of the river fishing for Black Bass, and I was using an eight-ounce, ash and lancewood Henshall rod, and ordinary Black Bass tackle.

On this occasion, and with this rod and tackle, I killed a redfish, or channel Bass, in twenty minutes, that weighed fully thirty-five pounds, though, as I did not weigh it, I called it thirty. It was a heavier and gamer fish than the mascalonge alluded to above; and, as I have weighed a good many redfish running from twenty to forty pounds, I can certainly guess within five pounds of the weight of one within these limits.

I was casting the minnow for Black Bass, on another occasion, up the St. Lucie river, in Southern Florida, and with the same rod and tackle just mentioned I hooked, killed and landed a tarpon of thirty-three pounds, in fifteen minutes

I have, with the same, or similar rods and tackle, killed many pike, mascalonge, tarpon, groupers, salt-water trout, etc., between ten and twenty pounds, but merely mention the above instances to prove the power of the minnow-casting Black Bass rod of eight ounces in weight and eight

and a quarter feet in length, and this must be my excuse for alluding to them here.

The introduction of this rod has no doubt done more than any thing else to popularize this style of fishing, and we may now consider minnow-casting as not only firmly established, but as an original and American method of angling that is peculiarly adapted to bait-fishing in our varied and extensive waters.

As an instance of its popularity I might add that, during the past five years, I have seen it employed in the waters tributary to the Red river of the North, in the Northern Peninsula of Michigan and Wisconsin, in nearly all the Provinces of Canada, and in Florida, and in many waters between. I have also seen it in numerous instances made to apply as well to estuary or coast fishing.

While minnow-casting for Black Bass is the most popular method in vogue in the West, it is very gratifying to me to see the favor with which it has been received in the Eastern States, and the remarkable progress that has been made in that best of all modes of bait-fishing; for it must be remembered that Black Bass fishing north of the Potomac and east of the Alleghany mountains is of comparatively recent origin, as it has not been many years since the Black Bass was introduced into eastern waters.

As a member of the Committee of Arrangements of the tournaments of the National Rod and Reel Association, I succeeded in having a special contest for "casting the minnow for Black Bass" admitted in the programme of events at the tournament of 1884, when the longest cast, with a half-ounce sinker, was made by Professor Alfred M. Mayer, the same being 97 feet.

At the subsequent tournaments the casting continually

improved, until at the last one, held in May, 1888, there were three gentlemen who cast upward of fifty yards; and out of five casts made by Mr. A. F. Dresel, the successful competitor, three of them went beyond fifty yards, and one reached the extraordinary distance of 168 feet, 4 inches. The weight of sinker cast was one-half ounce. The rods used were about eight and a quarter feet long, and about nine ounces in weight.

CHAPTER XXIII.

STILL-FISHING.

What angler's heart does not leap when he thinks of his boyish experiences in angling! We were all "still-fishers" then. The boy who began fishing on a small trout stream, though, would not tarry long in one spot; he soon learned that he must be a roving fisherman to fill his string.

But the boy who began on "sunnies," or red-eyes, or "brim," or gudgeons, or even bull-heads or suckers, imbibed his first lessons in the virtue of patience during his pin-feather days of angling.

What finished, artistic fly-fisher but would gladly hark back to those golden days! What a monument of patience he was, and what a fatalist as to luck, and what a firm believer in the secret, unwritten mysteries of the art, as he sat motionless on a rock, or perched upon a gnarled root, or lay prone upon a grassy bank, watching his float with all the eagerness and expectancy of a kingfisher on his dead branch, or an osprey on his cliff!

And how well he knew every "hole," and every submerged rock, and every snag; and just "how deep" to place his float, and just how long to let it run before "yanking" the fish or his hook into the limb overhead, or into the bush behind him!

And how well he knew every muskrat's run, and every kingfisher's perch, and every bank-swallow's hole; and, though watching his "cork" never so intently, how he had

an eye for every water-snake, and turtle, and bull-frog that stirred within ten rods of him!

And when an unlucky muskrat, or kingfisher, or snake, or turtle, or frog showed itself, how he would lay a rock on the butt of his "pole," and start in quest of it; and how these mammalian forays, and ornithic sallies, and reptilian assaults would rest him; and with what renewed zest he would repair to his fishing, and with what consummate and enduring faith he would spit on his hook, and resume his waiting and watching!

Oh! bright, sunny, golden days of youth! How far—how very far we have traveled down the stream since then! We may look back, and through the gaps in the trees, and over the low hills catch a sparkle of the stream behind and above us; but, alas! we can never go back—never return! Our course is ever on, on—and down, down—and the stream is ever widening and growing deeper, until it will soon be lost in the great gulf of the unknown!

I have much sympathy, and great respect, if not downright envy for the still-fisher. There is a juvenility, and a childish faith in his methods that are totally unknown, or utterly lost to the *blasé* old hand at fly-fishing, or minnow-casting.

His tastes are as simple, his expectations as great, his anticipations as easily satisfied, and his enjoyment as ample as in the pin-hook days of the best of us. He is, indeed, but a child of larger growth.

His life may have been saddened with the experience of time—his hands hardened with years of toil—his heart seared with the inhumanity of man—but he still retains the innocence and freshness of his youth when seated at the waterside with the "peeled sapling" in his stiffened hands

—the voice of the stream whispering in his ears—its moist breath stealing through his grizzled locks—and its rippling smile flashing on his tired eyes!

A Retrospection.

An old negro house-servant and a bright-eyed, flaxen-haired boy of eight summers sat side by side under a mill-dam, fishing. The old man was engaged in earnest conversation, to which the lad was an eager listener, save when interrupted by the pulling out of a fish or the re-baiting of a hook:

"Yas, Percy Lee, it's jist wasteful 'stravagance fer yo' papa to buy sich lavish, shiny fish-poles an' silver reel contrapshuns dat run riot wid his money. All de fish in de Elkhorn wouldn't 'gin to pay intrust on 'em. He's de beatenes' man for 'stravagance I eber see.

"De bestes' fish-pole is de strettes' an' slimmes' ellum saplin' you kin fine; cut in de fall in de lite ob de moon, an' peeled in de shade, an' put up in de lof' nex' to de cabin chimbly all wintah. An' de Bass an' chan'l-cat won't know wedder it cos' two cents or de price ob a yearlin' mule, case you yank 'em out so quick dey ain't got time to tink 'bout it."

"Yes, but Uncle Enoch, papa don't like to yank 'em out so quickly."

"No, honey, an' dats' wat beats me. He jis' goes a-wadin' in de water—an' he'll done cotch his deff o' rheumatiz one ob dese days—a-whippin' his little shiny switch, an' a-flippin' his fiddle-string line wid little teenty fedder-flies, an' de Bass cotch holt, an' ben' an' twis' de little pole, an' run off wid de line—an' Mars' Dick wind 'em up agin, an' de Bass pull out de line agin, an' jump out to see wat

gwine to happen nex', an' dey hav' mo' fun dan a bag full o' monkeys at de circus."

"But papa says he used to fish with cane poles and minnows, Uncle Enoch."

"Yas, Percy Lee, wen Mars' Dick was a little lam', jis' like yo'self, he use' to sot in dis same place wid me, an' laws-o'marcy wat gorms o' Bass, an' new-lites', an' chan'l cats we use' to snek out! But aft-a-wile he growed up an' den he marri'd Mis' Alice, an' dat quiled his fishin'.

"An' den de wah cum on, an' yo' papa went away to fite wid de sogers, when yo' was a teenty little baby; an' Mis' Alice use' to cum heah a-fishin' wid me, an' Liza Jane wud brung de baby. But Mis' Alice nebber cud larn to fish; she jis' kep' me a tellin' how yo' papa use' to fish when he was a little boy, an' wat he wud say, an' wat he wud do; an' she'd des go an' sot on dat ole sycamo' root—whar you settin' now—whar he use' to fish; an' de big tear-drops wud roll down her pink cheeks ebery time I cotch'd a fish, an' she wud run an' grab de baby—dat was you—an' hug you up, an' kiss you, and den want me to begin all ober agin. You see, honey, she was so chicken-hearted she cudn't bar to see de red-eyes an' new-lites a-floppin' on de hook. An' no matter how offen I 'splained to her how Mars' Dick use' to ketch 'em, an' how I kech 'em, she des was too tender-minded to larn.

"Den yo' papa cum home aftah de wah, an' brung a lot o' highfalutin noshuns wid him. An' de nex' summah a Yankee Kurnel from 'way up Norf cum a-visitin' an' he showed Mars' Dick how to fish wid switch poles an' fedder-flies.

"An' now Mars' Dick drags Mis' Alice wid him, an' she goes trapesin 'long de sho' wid de baskit—an' she'll ketch

her deff o' dampness sum day, you heah me—an' she watches him sling dem fedder-flies, an' claps her han's an' laffs, an' sez: 'Good boy; bravo, Dick!'

"An' wen de Bass is tucker'd out Mars' Dick shuv a little roun' net under him, an' raps him on de hed, an' totes him ashore; an' den him an' Mis' Alice sot dar an' look at it, an' yo' papa smokes his pipe, an' he tell Mis' Alice 'bout de fish jis' like I use' to talk to him when he was a little lam' like yo' ownself; an' dey spoon jis' as foolish as 'fo' dey was marri'd.

"An' Mis' Alice she meks de fedder flies fer Mars' Dick, now—she nebber did cotton to wums, an' craw-fish, an' crawl-debbils—an' she nebber cries now when de Bass snaps 'em. But, honey, he can't fool de chan'l-cat wid 'em; no, my young marstah, Mistah chan'l-cat is too wise in dis generation ob vipers fer dat. He wants a fat soft craw, or a piece of fresh libber. Gib him vict'ry or gib him deff.

"Cum, honey, we dun got a good mess o' pan-fish, less be gwine home; Mistah Crow dun lite out fo' his roost long time ago."

CHAPTER XXIV.

TROLLING.

THREE or four years ago I was attracted to Gogebic lake and Eagle waters in Northern Wisconsin to investigate the so-called "razor-back" Black Bass of Gogebic, and the mascalonge of Eagle waters. I found the former to be only small-mouthed Bass infected with tape worm, and the latter to be a true mascalonge.

At that time Gogebic lake was somewhat famous on account of its great numbers of Black Bass, and the ease with which they could be caught. While there I witnessed scenes and heard of acts (that may serve to point a moral) that should bring the blush of shame to the cheek of the most hardened; and yet they were perpetrated by men calling themselves anglers, or at least fishermen, for there is a difference in degree as well as in kind of those claiming allegiance to the "gentle" art.

On the first evening of my arrival I saw two large piles of Black Bass, enough to fill several barrels, burnt by the guides at the edge of the lake. Nine-tenths of them were caught with the hand-line and trolling-spoon by anglers—Heaven, save the mark!—who were fishing for count, or vying with each other as to who should bring in the greatest number.

It is no excuse to say that the Bass were there to be caught, or that the parties knew no better. They would have resented warmly any imputation that they were other

than humane, conscientious sportsmen. I will give a scrap of conversation that I overheard on the hotel veranda that evening; the reader can then judge for himself and draw his own conclusions.

"Well, old man, what luck to-day?"

"Bully! I took in out of the wet a hundred and twenty-five Bass, and would have had more but I lost all of my spoons. Then I went ashore and shot three or four 'porkies' with my pistol!"

Now here was a bloody-minded butcher who was not content, with the help of his boatmen, with slaughtering over a hundred Bass with the spoon, but who had the effrontery and insolence to brag of it before gentlemen; and to cap the climax of his truculence he boasted of shooting several innocent porcupines, a harmless, clumsy animal that can not get out of one's way, and whose only means of defense is to hump up its back and erect its quills; an animal that a sportsman never thinks of molesting.

"Pshaw!" chimed in a young man, who with several companions had been camping down the lake for a week, "we shot nearly fifty in a week near our camp; they gnawed the axe-handle and chewed up a pair or two of boots, and we started in to clean 'em out!"

And these young men had probably time and again responded to the commandment, "Thou shalt not kill," with "Lord, have mercy upon us, and incline our hearts to keep this law."

Now, I do not pose as a saint, or a Christian, or as an example, or as being any better than my fellows, for I am not—but I do hold that the wanton killing of the meanest creature is murder. At the same time, I can kill any animal—mammal, bird or fish—with clean hands and with a

clear conscience, when done in a sportsmanlike manner, and when I can utilize the same.

I assure the reader that the scrap of conversation given above is a mild sample of what I actually heard that evening. Some boasted of killing even more Bass than the individual mentioned, but I believe they added lying to their other accomplishments.

Then there were grouse and deer killed out of season—does still in milk, and grouse-hens with half-grown broods—but enough; these men were what they seemed, mere pretenders to the name of angler or sportsman, such as one is apt to meet at any summer hotel where there is fishing or shooting; men who under the guise of innocent sport indulge their thirst for blood and murder; men who are set and confirmed in their ways, and for whom there is no hope of improvement or reform.

But there are a few new hands who do these things thoughtlessly, and by the force of bad example; and it is for their benefit that I have written what might otherwise be deemed out of place, here.

CHAPTER XXV.

SKITTERING AND BOBBING.

Once, when in Florida, two of us had gone several miles up a river one day for deer and turkeys. When the sun was nearly down we had one deer, and had located several more, and also had found a turkey-roost near by. We concluded, instead of returning down the river to camp, to build a fire and sleep under a tree, so as to be on the ground at daylight in the morning, with the strong probability of another deer or several turkeys.

We did not wish to cut into the venison, as we intended to give it to a "cracker" family near our camp, the head of said household being down with "the shakes." We had only the liver of the deer for supper, and wishing to vary it with some other viand, concluded to try for a Black Bass in the river.

Happening to have a fish-hook in my pocket, I cut off a piece of the deer's tail, and made a "bob." Then, cutting a long, slender pole, and tying the bob to the end with a piece of strong twine some three feet long, we got into the boat, my comrade paddling and I manipulating the bob.

The sun was at the edge of the horizon, a huge ball of crimson fire, the atmosphere being somewhat smoky from fires kindled by the Indians to burn off the old grass in order to make a fresh "burn" for the deer to feed on.

The river expanded just above into quite a shallow lake, well grown with lily-pads, bonnets and saw-grass, through

which meandered several channels of open water. As we approached the lake, toward the sun, it seemed that these channels were filled with liquid fire, and the occasional leaping of a mullet, or dropping in of a small alligator, served to heighten this effect, and to simulate sparks and flames. The pure white wings of the egret, as it flitted over the water, seemed like miniature sails on a rubescent sea.

As my companion noiselessly paddled the boat along the fringe of rank grasses and luxuriant aquatic vegetation, I danced the bob along and over the water, now low, now high and now dipping in the water—skimming, leaping and flying—till it seemed an uncanny thing, as indeed it was, a cervine *ignis-fatuus*, a hirsute will-o'-the-wisp.

Several Bass rose to it, and swirled at it, until one more active than the rest grabbed it by a vicious lunge, and the hook was firmly implanted in his jaw. It was the work of but a minute to land him in the boat, and he was soon joined by another, when we repaired to our camp-fire which was now throwing a cheerful, ruddy light on the pines and palmettoes.

This was one of the occasions when the "bob," or the skittering-spoon, or the trolling spoon may be legitimately used; for we not only took great pleasure in the novelty of the sport, but we enjoyed a rich repast that night after roasting the Bass in their scales in the hot ashes, broiling the deer's liver on a split stick, grilling a few crackers of hard-tack, and making a cup of hot, strong coffee—leaving enough for a cold breakfast at daylight in the morning.

CHAPTER XXVI.

CONCLUDING REMARKS.

If this book should be the means of making a single day happier in the life of any angler, or of making some crooked things straight to the young hand, or of saving the life of one Bass that might have been otherwise killed by illegitimate means or sacrificed to unworthy motives, I shall be glad that it is written; for these considerations alone, and not for any personal profit or aggrandizement has it been penned.

And though there have been rods, and reels, and lines, and other articles of tackle named for me by enthusiastic friends and admirers, the honor itself has been my only recompense, for I assure the reader that I have never received, and would scorn to accept, any pecuniary fee or reward for any thing devised by myself, or made prominent by my efforts, for Black Bass fishing.

My sole aim and intention has been to elevate the Black Bass as a game-fish, and to provide suitable tackle for its pursuit and capture, and to inculcate a more healthful and humane and gentlemanly spirit among anglers.

If I have succeeded, in the slightest degree, my work has proved, as Walton said of angling, "like virtue, a reward to itself."

It is with a saddened heart, and an unwilling pen, that I now finish the concluding chapter of this supplement, for I feel that it is the last that will ever be added to this book.

There is not much likelihood of there being any occasion for adding any thing more to its pages during my life, and it is not at all likely that any one will ever add any thing to it after I am gone.

I feel like one who is making his last cast on a favorite pool that he will see no more forever. A pool that is endeared to him by the fondest associations. A pool whose every ripple is a smile—whose every changing mood is a look of gladness and delight—and whose steadily flowing current seems to beckon him to follow to

> "The undiscovered country, from whose bourn
> No traveler returns."

THE END.

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